Supreme Court of the United States

OCTOBER TERM, 1950.

No. 565.

RADIO CORPORATION OF AMERICA, NATIONAL BROADCASTING COMPANY, INC., RCA VICTOR DISTRIBUTING CORPORATION, *et al.*,

Appellants,

against

UNITED STATES OF AMERICA, FEDERAL COMMUNICATIONS COMMISSION, and COLUMBIA BROADCASTING SYSTEM, INC.,

Appellees.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION.

BRIEF FOR APPELLANTS

RADIO CORPORATION OF AMERICA
NATIONAL BROADCASTING COMPANY, INC.
RCA VICTOR DISTRIBUTING CORPORATION

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March 19, 1951.

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Introduction.

In the last four years a new industry—the television industry—has come into existence and has developed to the point where 45,000,000 people now receive television program service costing $150,000,000 a year (R. 607-08).

The public investment in television home receivers now totals $3,000,000,000, representing some 12,000,000 television receivers.

The growth of television has been based upon the high-quality transmission standards for black and white tele-

vision which were recommended by the industry and were adopted by the Federal Communications Commission (hereinafter called the Commission) in 1941 (R. 569).

Under these standards every television transmission is receivable by every television receiver within its range (R. 563, 581).

Under the order here under review this will no longer be true.

The order of the Federal Communications Commission would put into commercial operation a system of television from whose transmissions none of the 12,000,000 sets now in the hands of the public would be able to receive any picture whatsoever (R. 147, 559, 575, 794, 876; Tr. 3411,* 4612, 4750-51, 4829, 4949, 5134, 6442, 6546, 9962, 10022).

The transmission standards adopted by the order for color television are incompatible with the existing standards adopted for black and white television. Thus, no program broadcast in accordance with the standards adopted by the order can be received on any existing receiver.

If a television program were to be broadcast in accordance with the color television standards adopted by the Commission, none of the more than 45,000,000 people who now comprise the television audience would be able to get that program in any form whatsoever. Those of the 45,000,000 people who are accustomed to looking at a particular program would be unable to see that program when it is broadcast in accordance with the transmission standards adopted by the order.

This is what the incompatibility of the new standards means.

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* Reference is made in this manner to the transcript of testimony before the Commission. By order of this Court on March 5, 1951 leave was granted to dispense with the printing of this transcript.

Only after extensive and expensive adaptation could any of the existing 12,000,000 sets in the hands of the public receive any picture whatsoever from these incompatible color standards—and then only a degraded black and white picture having less than one-half the picture detail obtainable on the existing standards (R. 147-48, 575, 602, 794-95, 876; Tr. 2197, 3280, 3446, 3971, 4829, 4949, 5106, 9413-14, 9554, 10022-23). To get color under the standards fixed by the Commission, adaptation first is necessary and thereafter a converter must be added. This converter alone is twice as expensive as the adapter and does not increase the picture detail (R. 148-49, 575-76, 602, 876; Tr. 2671, 3687, 4863-64, 5328, 9134-39, 9154-64).

Nor does anyone maintain that all existing receivers, or anything approaching that number, will in fact be so adapted or converted. Indeed, the evidence is quite to the contrary (Tr. 4351-52, 5613).

Except for appellee Columbia Broadcasting System, Inc. (hereinafter called CBS)—the proponent of the incompatible system—the electronics industry, which created television and which has been responsible for its development, is agreed that a satisfactory compatible color system is attainable (Tr. 2529-30, 4864, 8185, 8199-8200, 8266-67, 8385-86, 9397, 9495). In a compatible color system the signals can be received on existing receivers as high-quality black and white pictures without so much as touching the receiver (R. 573, 580-81, 584, 879; Tr. 2664, 4857, 6051-53; Exhibits 203, p. 16*; 204; 206, pp. 1-2; 207, pp. 2, 16-17; 209, p. 10; 364; 365; 366; 367).

Again, except for CBS, not a single witness before the Commission testified that it was necessary or even desirable to adopt an incompatible color system in order to obtain color television.

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* Reference is made in this manner to the exhibits received in evidence during the administrative proceedings before the Commission.

The order of the Commission is not one which provides for a new and additional service on new and additional frequencies. Nor is it a mere licensing order affecting only a few applicants for a particular transmitting station in a single location.

The order would disrupt the whole basis of television service to the nation—as the adoption of a different gauge of railroad track would disrupt the nation's entire rail transport system—and with as little justification (R. 559, 580-81, 600, 608-11; Tr. 8184-86, 10093-95, 10101-02, 10529-30).

In addition, in authorizing the commercial broadcasting of an incompatible system, the Commission not only disregarded the almost unanimous position of industry experts, but it ruled out the broadcasting of compatible color in competition with incompatible color (R. 162-63, 432-34, 558, 580-81, 881; Motion to Affirm, p. 3).

This was done even though the uncontradicted evidence is that the broadcasting of compatible color would hurt no one (Tr. 6546, 8185).

Opinions Below.

The opinion of the District Court (R. 863-79) and the dissenting opinion of Judge La Buy (R. 879-81) are not yet reported.

Jurisdiction.

The orders of the District Court were entered on December 22, 1950 (R. 882) and January 23, 1951 (R. 883). A joint petition for direct appeal to this Court was filed January 25, 1951 (R. 884-85) and was allowed on January 25, 1951 (R. 892-93).

The jurisdiction of this Court is invoked under Sections 1253 and 2101(b) of Title 28 of the United States Code (28 U. S. C. §§1253 and 2101(b)). This Court noted probable jurisdiction on March 5, 1951.

Questions Presented.

The questions presented by this appeal are:

A. Whether the Commission acted in accordance with its statutory mandate to further the public interest and encourage the larger and more effective use of radio in the public interest when it adopted transmission standards for a television system which cannot be received at all by the existing 12,000,000 receivers in the hands of the public without extensive and expensive adaptation, and whether such action was arbitrary and capricious.

B. Whether the Commission acted in accordance with the general policy of the Communications Act of 1934 favoring competition in ruling out the broadcasting of a color television system that is admitted would hurt no one and which can be received on all the existing 12,000,000 receivers as black and white pictures without touching the receivers—particularly, where research and development is thus stifled, competition between competing color television systems is suppressed, and no findings have been made that competition between color systems for public acceptance should not be permitted.

C. Whether the Commission can lawfully enter an order

(1) upon a record which is concededly insufficient;

(2) which is not supported by substantial evidence;

(3) without adequately informing itself as to the facts upon which a legal order should rest although it was requested to do so;

(4) without complying with the Administrative Procedure Act;

(5) without having made the requisite findings necessary to support the order; and

(6) relying upon an interested staff engineer for determinative technical advice.

D. Whether the District Court erred in sending the case to this Court without having decided many determinative issues.

Statutes Involved.

The statutes pertinent to this appeal are annexed to this brief as Appendix A. They are Sections 303(c), (e), (f) and (g) and 402(a) of the Communications Act of 1934, as amended (48 Stat. 1082, 1093; 50 Stat. 197; 63 Stat. 108; 47 U. S. C. §§303(c), (e), (f), (g); 402(a); Sections 1253, 1336 and 2323 of the Judicial Code (62 Stat. 928, 931, 970; 63 Stat. 105; 28 U. S. C. §§1253, 1336, 2323); and Sections 4 and 10 of the Administrative Procedure Act (60 Stat. 238, 243; 5 U. S. C. §§1003, 1009).

Statement.

The Existing Television Service.

Television broadcasting standards for commercial service were first adopted by the Commission in 1941, after many years of research and development by the industry, extending as far back as the 1920's (R. 561-62, 569).*

The Commission did not adopt standards for the broadcasting of television in black and white until it was satisfied that those standards were of the highest quality obtainable in the state of the art then existing *and* left full scope for future development (R. 558-59, 562-69).

Nor was black and white television instituted on a commercial basis until the industry engineers were sub-

* The Act expressly provides that television broadcasting is *not* a common carrier service. Communications Act of 1934, as amended, Section 3(h).

stantially in accord that it was technically ready and were further in accord as to the standards upon which it should be based (R. 568-69).

The Commission recognized that the setting of basic standards was of great importance in determining the quality of the television broadcast service available to the public for the reason that such basic standards set the upper limits of performance which may be achieved by television transmitting and receiving equipment for the future as well as for the present (R. 559, 562-69; Tr. 7974-76, 7984, 8113, 9405, 9497).

The performance capabilities of these 1941 standards could not be fully utilized when they were adopted, because existing television transmitting and receiving apparatus had not yet been developed to that point (Tr. 7988, 8946-47, 9345-47). In fact, these standards still leave room for further improvement in existing black and white television broadcasting and reception. The standards were set in order to provide the highest possible performance within a 6-megacycle channel, both for the time when they were adopted and for the future (R. 569).

In stating the basis for its authority to adopt any standards at all, the Commission said in 1940 that, as a practical matter, standards were needed in order to "assure to the public in basic outline a single uniform system of broadcasting which will enable every transmitting station to serve every receiver within its range."*

This statement was made in connection with the Commission's refusal to standardize on a system having 441 lines and 60 fields** per second. The standards finally

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* FCC, REPORT OF THE COMMISSION IN THE MATTER OF ORDER No. 65 SETTING TELEVISION RULES AND REGULATIONS FOR FURTHER HEARING, Docket No. 5806, p. 2 (May 28, 1940). The record in Docket No. 5806 was incorporated by reference in the proceedings here under review at the request of Commission counsel (Tr. 8873).

** Two "fields" in black and white television make up one "frame" or a single picture.

adopted on May 3, 1941 had 525 lines instead of 441, and the Commission stated that 525 lines and 60 fields "give substantially equal resolution and more fully exploit the possibilities of the frequency bands allocated for television," and noted that these standards "represent, with but few exceptions, the undivided engineering opinion of the industry."*

The permanent nature of the standards, once adopted, and the high quality of the service that can be provided within those standards, are the foundation upon which the present television broadcasting service rests (R. 559, 569-70, 608-09).

Although World War II delayed the commercial development of television on any substantial scale until the end of 1946, the growth of the television industry has been without parallel in the history of American industry. On January 1, 1947, there were an estimated 15,000 television receiving sets in the hands of the public. On January 1, 1948, the number is estimated at 200,000; on January 1, 1949, at 1,000,000; on January 1, 1950, at 4,000,000; as of the effective date of the order, at more than 9,000,000; and as of March, 1951, it is estimated that 12,000,000 black and white television receivers are in the hands of the public (R. 608).

These 12,000,000 television receiving sets represent an investment of $3,000,000,000 and a television broadcasting audience of 45,000,000 people.**

At the same time, black and white television broadcasting has also grown to the point where the public is now receiving television broadcast programs costing $150,000,000 a year (R. 607-08).

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* FCC, REPORT, Docket 5806, pp. 2, 3 (May 3, 1941).

** The figures referred to by the District Court were as of November, 1950 (R. 794). At that time there were more than 9,000,000 television receiving sets in the hands of the public and a television audience of 35,000,000 people.

The interdependence of the number of receivers in the hands of the public capable of receiving a service and the ability of the broadcaster to furnish a service to those receivers is basic to the economics of all broadcasting (R. 608; Tr. 7229-31, 8027-28).

At the outset, television broadcasting was conducted at substantial financial loss to the television broadcaster. As a result of the steady and rapid increase in the number of television receivers in the hands of the public, the broadcasters have been able to increase and expand their program service. Before the order there was the prospect of a television audience sufficient to permit the widespread broadcasting of television programs without financial losses. Indeed, some television broadcasters are now able to render their service without loss (R. 610-11; Tr. 7230).

In only four years the television industry has attained a public acceptance and is rendering a public service far beyond the highest expectations anyone had either in 1941 or in 1946.

The growth of television has been based upon the high-quality transmission standards for black and white television which were recommended by the industry and adopted by the Commission in 1941 (R. 569-70, 608-09).

Under these standards every television transmission can be received by every television receiver within its range (R. 559, 563, 608). Under the order this would no longer be true.

If the order goes into effect, broadcasters face the prospect of putting on CBS incompatible color programs to a non-existent audience.

The Incompatible CBS System.

While the order takes the form of amendments to the Commission's "Standards of Good Engineering Practice Concerning Television Broadcast Stations", the effect of

the order is to adopt the color television system of CBS to the exclusion of all other color television systems (R. 420-21, 432-34, 558, 794, 881; Motion to Affirm, p. 3).

In its Notice of Further Proposed Rule Making (FCC 49-948) of July 11, 1949, instituting these proceedings, the Commission proposed, among other things, to consider color television systems, provided that such color systems met two criteria: first, that they operate in a 6-megacycle channel (the frequency channel width allotted to black and white television broadcast stations); and second, that the pictures be received on existing television receivers "simply by making relatively minor modifications in such existing receivers" (R. 26).

CBS proposed a color television system which operates in a 6-megacycle channel, but which cannot be received on any existing black and white receiver (R. 147, 559, 575, 794, 876; Tr. 3411, 4612, 4750-51, 4829, 5134, 6442, 9962, 10022).

Extensive changes or "adaptation" in existing sets must be made in order that the color broadcasts may be received even in low-quality black and white (R. 147-48, 575, 602, 794-95, 876; Tr. 2197, 3280, 3446, 3971, 4829, 4949, 5106, 9413-14, 9554, 10022-23). In addition, after adaptation, a "converter" must be added to get color. The converters demonstrated by CBS utilize a mechanical spinning disc of red, green, and blue filters in order to produce color (Tr. 2671, 3687, 4863-64, 5328, 9139, 9154-64).

Fundamentally the same system had been brought before the Commission twice before, once in 1941 and again in 1946 (Tr. 3078, 8885-86, 8891-92).

The black and white television transmission standards provide for the broadcasting of a television picture which has 525 lines and 60 fields per second. The present black and white standards are such that the picture which appears on the face of the television receiver is comprised of

approximately 200,000 picture elements (Tr. 5328). It is this large number of picture elements which accounts for the high degree of picture detail and the corresponding picture quality produced.

On the other hand, the color television transmission standards adopted by the Commission provide for the broadcasting of a television picture which has 405 lines and 48 color fields per second. With this system, the picture which appears on the face of the television receiver is comprised of only approximately 80,000 picture elements, which is a severe decrease in picture detail and corresponding picture quality (R. 360, 575-76, 584; Tr. 3971, 4734-37, 5088, 5134, 5326-28, 7357-59).

Not a single receiver now in the hands of the public is capable of receiving any picture from television broadcasts on this system (R. 147, 559, 575, 794, 876; Tr. 3411, 4612, 4750-51, 4829, 5134, 6442, 6546, 9962, 10022). The broadcaster will not be able to build upon the 12,000,000 existing receivers. With the incompatible system the broadcaster must start to build circulation all over again (Tr. 7229-31).

Instead of the public, including the 12,000,000 owners of existing black and white receivers, being able to receive the programs of every transmitting station within range, the television broadcasting service must now be split between the two incompatible sets of standards—color and black and white (R. 558-60, 580-81, 608-09, 794).

Each set owner would have to spend $50 or more, or a total of over half a billion dollars, to restore the program service which the 12,000,000 owners of television sets now receive (R. 147-48, 602, 876; Tr. 4747, 4830, 5538-41, 6858, 6889, 8187; Exhibits 204, 282). Even if this expenditure were made, the picture obtained from CBS color transmissions would be only a degraded black and white picture having less than half the detail of present black and white

television pictures (R. 575, 794-95, 876; Tr. 2197, 3280, 3446, 3971, 4829, 4949, 9413-14, 9554, 10022-23).

The further addition of CBS disc color converters would require the 12,000,000 people who now own television receivers to incur the further expense of well over a billion dollars (R. 148-49, 602, 795, 876, 881; Tr. 2671, 3687, 4863-64, 9134-39, 9154-64; Exhibits 204, 408). Again, the picture so obtained would have less than half the detail of that provided by the existing service (R. 360, 575-76, 584; Tr. 5328).

In addition, the spinning disc converters are cumbersome and involve a limitation of picture size to 12½ inches (R. 148-49, 150, 164, 418, 602; Tr. 2030, 3217-18, 3237-38, 3448, 4754, 9202-03). In contrast, more than 90% of the television sets sold today have a picture size of 16 inches or larger (R. 602; *cf.* Tr. 4306, 4754, 9390-91, 9999; Exhibit 386).

The public must also accept the addition of unsightly gadgets to existing sets which have been designed as pieces of home furniture (Tr. 9154-64, 10000).

By no stretch of the imagination can the addition of an adapter costing $50, or a total of over half a billion dollars on the assumption that all existing sets were adapted, nor the further addition of a converter costing $100, or a total of well over another billion and a half dollars on the assumption that all existing sets were also converted, be called minor modifications within the meaning of the Commission's second criterion in its notice instituting the color proceedings. The total price of many new black and white sets is less than $150 (Tr. 9099).

The RCA Compatible Color Television System.

After it became apparent that black and white television was going to achieve the phenomenal success which it now has attained, major efforts in the television industry were directed to the development of a compatible color television

system. Only CBS continued to tinker with its incompatible system, and proposed in 1949-50 the adoption of a system with even less picture detail than that put forth by it in 1941 (Tr. 5648, 8899-900).

Radio Corporation of America (herein called RCA) presented a 14-megacycle system to the Commission in 1946, which was designed to operate in the area of the frequency spectrum which lies above the frequencies in which television now operates (Tr. 2656; Exhibit 206).

That 14-megacycle simultaneous system, unlike the CBS system, had already been so designed that the color transmissions could be received on a black and white set as black and white pictures (*Ibid.*).

The presentation of this simultaneous system, together with the defects of the system which was proposed by CBS in 1946, led to the refusal of the Commission to adopt the CBS system after the 1946-47 color hearings.* The CBS system was rejected because of many of the defects which it still has, even though its system then had a much higher picture quality than it now has by virtue of the use then of a 16-megacycle channel (R. 570-72, 575; Tr. 4752-53, 5558-59).

In 1948 RCA concluded that only a color television system which would operate in a 6-megacycle channel and which would be receivable on all existing television receivers without alteration and without degradation of picture quality could render a public service. The problem was to find a way to transmit the full 14-megacycle picture of the 1946 RCA simultaneous system in a 6-megacycle channel and to do so without loss of picture quality (R. 573; Tr. 2657-59, 2812; Exhibit 206).

By the time the 1949 color hearings commenced, RCA had developed a new and unique combination of the RCA

* FCC, REPORT, March 18, 1947, 11 F. C. C. 1523.

1946 simultaneous system with other electronic techniques. For the first time principles had been developed which made it possible to transmit and receive a color picture having 525 lines, 60 fields, with picture quality equivalent to that of black and white service, in a 6-megacycle channel (Tr. 2658-60; Exhibits 206, 209).

For the first time, a color system had been developed which could be received on all existing receivers as a high-quality, full-definition black and white picture, without so much as touching the receiver, and, at the same time, could be received on appropriate receivers as a color picture (R. 573).

RCA presented evidence with respect to its system, and demonstrated the system, during the course of the color hearings instituted on July 11, 1949. With the exception of CBS and a Commission engineer named Chapin, the engineers and scientists of the entire television industry, including independent experts, testified in favor of a compatible, all-electronic, high-definition color television system, such as that proposed by RCA (Tr. 2529-30, 8199-201, 8266-67, 8384-85, 9397, 9413-14, 9495, 9685).

The RCA compatible, all-electronic color television system is relatively new. On the other hand, the CBS incompatible system has remained basically as it was in 1940 (Tr. 8885-86). And a mechanical disc is still used by CBS with its inherent limitations on picture size, rather than electronic means, to produce color.

As successively demonstrated during the hearings, the RCA compatible system has improved in practical operation by leaps and bounds. This is conceded by all (R. 871-72, 881; Tr. 6130-31, 7994, 8516, 8611, 8882, 9619, 10002, 11282).

For example, the record reflects the following comments of members of the Commission with respect to the RCA system:

The Acting Chairman of the Commission stated to an RCA witness on the record on April 11, 1950 that:

> "... your picture is greatly improved since your first showing." (Tr. 8516)

Another Commissioner commented on March 16, 1950:

> "... we have seen that [the RCA system], and *it produced beautiful color.*" (Tr. 6900)*

The same Commissioner also stated on February 27, 1950:

> "I noticed the marked improvement in your color the other morning at Laurel, and I think we all did, and I was completely surprised by the *life-like reproduction*, particularly in the final RCA picture, where the man inserted flowers in that shallow dish." (Tr. 6130-31)

In addition, by the latter part of the hearings, RCA had developed and demonstrated the tri-color picture tube, one of the greatest inventions in the electronics art (Tr. 7989, 7994, 8130-32, 10040, 11282; Exhibit 382).

As a goal of research, compatibility was a difficult engineering problem. Its achievement was a scientific accomplishment of first importance to the economics of color.

It is compatibility that makes it economically practical for the broadcaster and the sponsor to broadcast in color, their choice programs, in choice time.

With a compatible system the broadcaster does not have to wait for color receivers to appear in quantity. Nor does he have to confine color broadcasts to fringe time (*cf.* Tr. 2980, 2983).

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* Italics ours throughout.

From the standpoint of the public interest, compatibility thus becomes of first importance in promoting color itself. With a compatible system the broadcaster will have every urge to bring color to the public. Without it many cannot afford to do so.

It would be the greatest mistake to conclude that compatibility is simply a method of continuing black and white reception to present owners of receiving sets. The incompatibility of the color standards adopted is bound to be a major factor in delaying the coming of a sound color service on a national basis (Tr. 2980, 2983, 7177, 7229-32, 8015-16, 8027, 8781, 10002-03).

Efforts of Others to Develop Compatible Color Systems.

Color Television Incorporated (hereinafter called CTI) also presented evidence at the hearings with respect to an all-electronic and theoretically compatible system. The CTI system, however, was in a less advanced state of development than the RCA system. After the close of the testimony on May 26, 1950, CTI petitioned the Commission to consider a new all-electronic, compatible color system known as the "uniplex" system (R. 593).

After the hearings had closed, the General Electric Company also announced a new all-electronic, compatible color system (R. 593).

In the meantime, the Hazeltine Electronics Corporation, one of the leaders of the industry in television research and development, had been experimenting with various aspects of all-electronic, compatible color television systems including, in particular, the RCA system (R. 372, 593).

It was thus apparent well before the adoption of the order, that major efforts in the electronics industry were being directed to the development of a compatible, high-

definition, all-electronic color television system, and that these efforts were achieving and had achieved marked success.

The Rejection of Compatible Standards.

The taking of testimony before the Commission ended on May 26, 1950, and on September 1, 1950, the Commission issued its First Report, which purported to evaluate the CBS, CTI and RCA systems, but adopted none of them.

With respect to compatible color television systems, the Commission recognized that "fundamental research cannot be performed on schedule" and that "much of the fruit of this research is only now beginning to emerge" (R. 165-66). Accordingly, the Commission stated that it wished more time before freezing standards for color.

On the other hand, the Commission also found defects in the CBS incompatible system, ten years old and at least once rejected as it was, which the Commission thought should be overcome before adoption, even assuming that an incompatible system should in any case be adopted. These limitations were susceptibility to flicker, low picture detail, and limited picture size (R. 163-65).

The Commission stated *as to all three of these limitations* that the adoption of the CBS system without further information would mean that the Commission was

> "compelled to *speculate* as to an important basis for its decision. . . ."

and that

> "the Commission's determination on an important part of its decision would be based on *speculation and hope*. . . ." (R. 165).

In spite of these clear statements that a decision could not properly be made *without further information* and fur-

ther opportunity for the development of all systems, the Commission on October 10, 1950 adopted standards for the CBS incompatible system without receiving such further information as to the CBS system, refusing to consider further information with respect to the RCA system, and without according opportunity for further development (R. 408-09, 410-12, 418-20, 427-29, 430-31, 870-71, 879-81; Tr. of Proc. 233-34).*

The Commission's First Report clearly shows that the ultimate adoption of the degraded, incompatible CBS standards on October 10, 1950, was occasioned solely by the Commission's desire to adopt *a* color system—any color system—immediately, without regard to the rapidly advancing progress of the art.

While recognizing the desirability of compatibility, the Commission ruled this all-important matter out as a factor in the selection of systems on the basis of its opinion, "based upon a study of the history of color development over the past ten years", that compatibility is "too high a price to put on color" (R. 156).

No mention is made of the fact that many of these ten years were war years—or of the fact that even black and white television did not really start until four years ago—or of the fact that the present recognition that color television should occupy only 6 megacycles did not come until 1948 (R. 577-78; Tr. 2657-59, 2812; Exhibit 206).

Nor is any effect given in the Report to the tremendous strides which have been made in the development of compatible, all-electronic, high-definition color television systems.

If the Commission's reasoning were to be followed, CBS should receive an accolade for arriving, in 1950, at a point below where they were in 1940; and the entire body

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* Reference is made in this manner to the Transcript of Proceedings in the District Court.

of television engineers should be castigated for making progress. In fact, this is precisely what the Commission did.

The Commission expressly stated that in spite of the necessity for it to rely upon industry experts for data and expert opinion in arriving at standards, and in spite of the fact that its own facilities are concededly too limited to gather much of the data, it would nevertheless disregard the virtually unanimous views of industry experts as set forth in the record (R. 162-63, 578-79, 589).

(a) *Rejection of Expert Evidence.*

There appeared before the Commission responsible experts of many television industry committees and of many industry laboratories. Dr. DuMont and Dr. Goldsmith of the Allen B. DuMont Laboratories appeared. Dr. Baker of the General Electric Company, D. B. Smith of Philco, and Dr. Lee DeForest appeared. Dr. Engstrom and Dr. Brown of RCA appeared. Independent experts such as Donald G. Fink of the Joint Technical Advisory Committee appeared. All these people, and others, testified: (a) that a compatible system should be adopted; (b) that a high-quality system should be adopted; and (c) that the Commission should not stultify research by accepting anything less (R. 589; Tr. 2529-30, 3896, 4849-50, 5499, 5903, 7974-76, 8095, 8199-200, 8266, 8385-86, 9397, 9495, 9696, 9866, 10046-47, 10057).

All these people have high and honorable reputations in their professions. All these people have heretofore been respected and heeded by the Commission. None of these people advocated the adoption of the CBS system (R. 589).

These men, and indeed the whole profession of radio engineering, are stingingly indicted in the separate concurring opinion of Commissioner Jones attached to the First Report, even to the point of implying that all these engineers had

prostituted their professional integrity to the economic desires of their respective companies.* This indictment comes from a man with no engineering training with respect to an industry which has a record of a more dynamic and rapid advance than any other, and of an engineering group which has accomplished modern miracles.

As stated by Donald G. Fink, a distinguished independent electronics engineer and an outstanding editor in the field of electronics (R. 578-79):

> "We wonder whether the worthy Commissioner knows the men he so recklessly and immoderately attacks. The combined membership of these [engineering] committees comprises 121 men, 45 of whom are fellows of the IRE [Institute of Radio Engineers], 25 directors, past and present, of the IRE, the present president of the IRE and eight past presidents, six men who hold the IRE Medal of Honor and four others who have won the IRE Morris Liebmann Memorial Prize.
>
> "An indictment of these men is an indictment of the whole profession of radio engineering. They have built the radio service of the United States from its earliest days, they have managed the technical effort in electronics during two wars. Without their cooperation, the FCC simply cannot function in regulating its highly technical domain.
>
> "When one man aligns himself against a whole profession, fair-minded men will conclude that the man is wrong."

(b) *The Refusal to Allow the Time Previously Recognized as Necessary for Development.*

Many of the industry experts advocated the RCA simultaneous system in 1946-1947. The Commission itself re-

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* The Commission in its First Report endorses the views of Commissioner Jones with respect to this expert evidence (R. 162-63).

jected the CBS system at that time, at least in part because of the presentation of the RCA simultaneous system.

At that time the Commission noted that it would take from four to five years to develop this system into a commercial service (R. 570-71, 574). In 1948 the Commission still regarded four or five years as an appropriate period of time for the commercial development of the RCA color system (R. 574). Commissioner Hyde, speaking for the Commission in January of 1948 before the House Committee on Appropriations, stated with respect to standardization on a color system:

> "But the Commission felt, after hearing all of the evidence, that there was room for a good deal more improvement, and that if we crystallized the thing now by establishing standards which would control, that the public would not have as good service as will be possible in the reasonably early—near future. It was indicated it would be 4 or 5 years before it would be possible to do much about it." *(Hearings before Subcommittee of the Committee on Appropriations on the Independent Offices Appropriation Bill for 1949,* 80th Cong., 2d Sess., 1035 (1948))

A majority of the then Commission, including Chairman Coy, Commissioners Sterling and, of course, Hyde, were present in the hearing room when this statement was made (R. 574).

Within less than these four or five years, RCA had already done more than was contemplated in 1947. By the addition of new electronic techniques, RCA had succeeded in enabling its simultaneous color television system to operate in a 6-megacycle rather than a 14-megacycle channel, without loss of picture quality (Tr. 2656-60, 2812, 6130-31, 6139, 6900, 8516; Exhibits 206, 209).

In addition, RCA had developed the single direct-view tri-color picture tube, one of the greatest inventions of the television art, and upon which all proponents of color television systems recognize their dependence (Tr. 4583, 6253, 6862-64, 7889, 7994, 8201, 8279-80, 9618-19, 11281-82).

In the light of these facts, the Commission's rejection of the experts of the industry amounts, in fact, to nothing less than a refusal to let research and development in the television industry take its necessary course.

(c) *The Commission Also Has Ignored Wholly Independent Evidence.*

The Commission has rejected not only the virtually unanimous expert opinion of television electronics engineers, but in addition has ignored the evidence of concededly impartial scientists.

Dr. Edward U. Condon, Director of the National Bureau of Standards, under date of May 20, 1949, was requested by the Chairman of the Senate Committee on Interstate and Foreign Commerce to organize a committee to give "sound, impartial, scientific advice" on color television. This committee, known as the Condon Committee, was headed by Dr. Condon and consisted of "a small group of scientific persons of repute, none of whom are employed by or have any connection directly or indirectly with any radio licensee or radio-equipment manufacturer" (R. 333, 582-83, 872-73).

The Report of the Condon Committee, which was released July 10, 1950,* considered at length the three color systems which had been proposed and analyzed the present and potential performance of those systems. The distin-

* The Condon Report is printed as SEN. Doc. No. 197, 81st Cong., 2d Sess. (1950). See R. 330-97.

guished group of scientists composing this Committee stated its hope that "the report will provide a comprehensive and understandable basis on which the technical factors may be considered in arriving at a decision."

The Report of the Condon Committee was based on the testimony and demonstrations given before the Commission and upon certain other demonstrations and tests (R. 335-36, 358, 364, 583).

Neither Report of the Commission mentions the findings and conclusions of the Condon Committee. In fact, one Commissioner has publicly stated that the Commission did not even consider the Report of the Condon Committee in reaching its decision (R. 589). And appellees have gone so far as to state that the Commission could not lawfully consider this Report (Appellees' Brief in District Court, p. 28; Motion to Affirm, pp. 21, 23).

With respect to the Condon Report, the majority of the District Court stated:

> "No doubt this report refutes numerous of the findings made by the Commission and gives a far more favorable appraisement of the RCA system than that attributed to it by the Commission." (R. 873)

A table showing some of the important conflicts between the findings with respect to the RCA system made by the Condon Committee and the findings made by the Commission is set forth in Appendix B of this Brief.

One of the most significant observations, however, is that the Condon Committee found that the "effectiveness of channel utilization of the RCA color system is the highest of all the systems" proposed to the Commission during the color hearings (R. 370).

Spectrum space is scarce. The conservation of radio frequencies is one of the most important responsibilities

of the Commission in order that the fullest service may be obtained.

The fact that the RCA color system makes the most effective use of the radio frequency spectrum is not even mentioned in the Commission's Reports, in spite of the fact that the Communications Act specifically enjoins the Commission to encourage "the larger and more effective use of radio in the public interest" (§303(g)), and in spite of the fact that the Commission has heretofore regarded this as one of its paramount duties (R. 586-88).*

The Commission's attempt to discredit the industry experts who appeared before it can hardly stand up in the light of the Condon Report (R. 589).

(d) *The Commission's Reliance on Interested Staff Engineer.*

The Commission's refusal to credit the testimony of the leading engineers of the television industry and of independent electronics experts, including the Condon Committee, is to be contrasted with the fact that the only witnesses who testified in favor of the adoption of the CBS system were CBS and Chapin, one of the Commission's staff engineers (R. 581).

The testimony of the CBS engineers in favor of the adoption of a ten-year old system is obviously testimony with a bias. Unlike the electronics experts seeking to advance the forefront of science, these people sought only to defend ten years of tinkering with a mechanical disc.

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* Thus, the Commission stated in 1941, in rejecting a black and white television system of 441 lines in favor of the present system of 525 lines, that the latter is preferable by reason of the fact that it "more fully exploit[s] the possibilities of the frequency bands allocated for television". FCC, REPORT, Docket No. 5806, p. 3 (May 3, 1941).

With respect to Chapin, the record shows that he was the co-inventor of an automatic switch usable with the CBS system but not with a compatible color system. While Chapin forswore any financial interest in the invention, the interests of prestige and reputation through the adoption of the CBS system and the consequent use of his invention remained (R. 12-13, 581).

Although RCA objected,* this engineer was allowed to continue in the proceedings and subsequently gave testi-

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* The record reflects the objection and the response of the Chairman of the Commission as follows:

"Mr. McDaniel: Mr. Chairman, I understand that this development of Mr. Chapin's constitutes what might be considered an improvement in the particular system being proposed by CBS in these proceedings.

The Commission in this case is in a judicial capacity, I assume, because it may have to choose between contesting proponents here, and when the Commission comes forward with a development which seems to be an improvement in the system proposed by one of the litigants, it sounds a little bit like a person in a judicial capacity assisting one of the parties in the contest.

I just want to make that statement and say that we take exception to putting this development into these proceedings, because we think it is inconsistent with the judicial position which the Commission should take in the proceedings.

Mr. Salant: Would you like a statement from me?

The Chairman: I think not, unless you feel called upon. I think I can take care of it myself.

Mr. Chapin, who is putting this in, and another employee of our Commission, have developed this and have filed for patents on the development. Mr. Chapin is the head of our laboratory, he is not a member of the Commission, and in no way in position to determine the vote of a single member of the Commission; nor is any other member of the staff of the Commission. The Commission is perfectly competent and has the ability to determine between contesting forces in these hearings, whether it is RCA, CBS, DuMont, CTI, or anyone else; and I want to say on the record that I resent the suggestion very much that the Commission is influenced in its determination by the work of a single member of its staff or all of its staff when it comes to making a decision on the record in these proceedings.

If there is anything else to be said on this, let's get it off our chest now." (Tr. 5980-82)

mony favorable to the CBS system. His predisposition is attested to by his comparison of the RCA color receivers with the CBS color receivers. Chapin stated that the CBS receivers were superior to the RCA receivers because the latter were too big and too complex. But his testimony related to certain RCA receivers having over 100 tubes used by RCA in the early part of the color hearings and completely ignored later RCA color receivers using less than one-half this number of tubes, which were demonstrated to Chapin *before* he gave his testimony. It was not until cross-examination by RCA, however, that these facts were brought out (R. 582; Tr. 10626-30).

Chapin was not merely a witness. On the contrary, Chapin had charge of the Commission's laboratory which tested the color systems. In addition, Chapin participated in the formulation of the order and reports of the Commission which are under review, and the Commission relied on his advice in weighing the highly technical issues before it (R. 12-13, 581-82).

Only two of the seven members of the Commission have had technical training, and one of the two dissented from the adoption of the order. He was formerly Chief Engineer of the Commission. The rest are laymen (R. 581). Although the order purports to rest upon judgments of a highly complicated electronics art, it is notable that the Commission has found it necessary directly to repudiate every disinterested industry expert who appeared before it, and that many of its findings are supported only by the testimony of CBS or by Chapin.

Only by refusing to pay attention to the overwhelming evidence supporting the adoption of an all-electronic, compatible, high-definition color television system given by those who knew and had faith in the electronics art, and by relying upon the proponents of an out-moded mechanical

method, could the Commission attempt to justify arresting the development of television by the adoption of the CBS system.

The Conditions Upon Which the Commission Said the Adoption of the CBS System Might Be Avoided.

The Commission itself, however, was unwilling to adopt the CBS system. By its First Report, the Commission did not adopt commercial color television standards. Recognizing the incompatibility of the CBS system, its need for greater picture detail and for larger picture sizes, the Commission sought to permit the development of color television systems to proceed, but only upon conditions (R. 163-68, 192, 869-70).

The Commission proposed (1) that if most of the television manufacturing industry would agree to change its entire production of black and white television receivers from and after early November, 1950, so that such receivers would operate on a wholly new and continuously variable set of black and white standards (including the number of lines and fields called for by CBS standards), and (2) that if such continuously variable or "bracket" black and white standards could be adopted by the Commission *without a hearing,* then and only then would the Commission consider improvements in all proposed color systems, as well as possible new color systems, before reaching a final decision. If either of these two conditions were not met, the Commission stated it would adopt forthwith the CBS color system (R. 166-68).

The Commission's Notice instituting the hearings, it should be noted, made no mention of these so-called bracket standards. Nor was there any evidence in the hearings with respect to such standards. As one Commissioner, the former Chief Engineer, stated in his dissent (R. 421):

> "The subject of bracket standards was not at issue in the hearing nor was the subject even advanced during the hearing. * * * the subject of bracket standards was a new concept in field and line scanning proposed after the hearing record closed. It came as a surprise to industry and was not based upon information appearing in the record of this proceeding."

The Commission requested the television manufacturing industry to submit comments with respect to this proposal. In response to this, comments were filed and, with minor exceptions, those of the television manufacturing industry who submitted comments stated that to change their production of black and white receivers in accordance with the Commission's proposal was impractical, unnecessarily costly to the public, and could not be done in accordance with the time schedule required by the Commission (R. 309-16, 421-27, 576-77, 870).

These comments also pointed out: (a) that the attempt to regulate television receiver manufacturing was beyond the jurisdiction of the Commission; and (b) that the procedure for the adoption of bracket standards without a hearing was contrary to proper administrative procedure and to the Commission's own rules (R. 306-09, 316, 576-77).

The Commission's Refusal to Consider New and Determinative Developments.

It is plain that the Commission's First Report recognized the need for further information as to the rapidly developing technical aspects of color television (R. 164-66). It is equally plain that the Commission should have considered such further information as was available before adopting the CBS standards, particularly in view of the fact that the bracket standards proposal was entirely impractical (R. 190-93, 306-16, 421-31, 592-93, 871-72, 878-81).

On July 31, 1950, RCA had submitted to the Commission its Progress Report concerning the realization of improvements in its system apparatus which were stated during the hearings to be in progress (R. 399-404).

In its Comments in response to the Commission's bracket standards proposal, RCA called the Commission's attention to other evidence relating to compatible, high-definition, all-electronic systems, including the RCA system, and submitted copies of the Condon Report and its Progress Report (R. 330-406).

In its Petition of October 4, 1950, filed after it had become apparent that the bracket standards proposal was impractical, RCA formally asked the Commission to review the improvements made in the performance of the RCA system and to view experimental broadcasts of color signals of the RCA, CBS, CTI, and other systems, before making a final determination in respect of color standards (R. 408-09).

Meanwhile, others, including the General Electric Company, Hazeltine and CTI, had also called the Commission's attention to further developments in compatible, all-electronic, high-definition color television systems (R. 593).

Nevertheless, the Commission refused to consider any of these important developments and denied the RCA Petition out of hand. On October 10, 1950, the Commission published its Second Report adopting the CBS system and concluding, *without looking at them,* that no improvements in existing systems warranted a reopening of the record (R. 419-20).

In this connection, the majority of the District Court said of the Commission's refusal to further inform itself:

> "Admittedly, much progress was made during the latter portion of the hearings and, as claimed, after the hearings closed, in the development of a compatible system of color television. Particularly was

> such progress made by RCA, and as we view the situation the most plausible contention made by plaintiffs is that the Commission abused its discretion in refusing to extend the effective date of its order so that it might further consider the situation, and particularly the improvement which it is claimed had been made by RCA and others." (R. 871-72)

In dissenting from the decision of the District Court, Judge La Buy stated:

> "... it is difficult to understand why the Commission refused to hear additional evidence and chose instead a course of action, using its own words, based 'on speculation and hope rather than on demonstrations.'" (R. 881)

In addition, the majority of the District Court also stated:

> "... a number of critical findings [of the Commission] are based upon evidence which was taken in the earlier stage of the proceeding which is not representative of the situation as it existed at the time the findings were adopted." (R. 871)

The Proceedings Before the District Court.

On October 17, 1950, appellants RCA, National Broadcasting Company Inc. (herein called NBC) and RCA Victor Distributing Corporation brought suit in the District Court of the United States for the Northern District of Illinois, Eastern Division. This suit was brought to enjoin, set aside, annul and suspend the order of the Commission adopting the incompatible CBS color television system to the exclusion of any other color television systems. The order by its terms was to go into effect on November 20th. The complaint prayed both an interlocutory and a permanent injunction and a temporary restraining order while the suit was *sub judice*.

RCA is engaged, among other things, in research and development work in the field of electronics and particularly in the field of radio and television, both black and white and color. RCA is also engaged in the manufacture and sale of radio and television transmitting and receiving apparatus and tubes. NBC, which is owned by RCA, is engaged in sound and television broadcasting and in sound and televion network broadcasting. The RCA Victor Distributing Corporation, an Illinois corporation, also a subsidiary of RCA, is engaged in the sale of television receivers and other products made by RCA Victor Division, the manufacturing division of RCA, to dealers located in Chicago and other cities (R. 2-3, 598, 606-07, 612, 863-64).

CBS was allowed to intervene in support of the order by agreement of the parties (R. 789-90, 864).

Various intervener-appellants were permitted by the District Court, over objection of appellees, to intervene for the purpose of attacking the Commission's order. Intervener-appellants are Emerson Radio & Phonograph Corporation, Pilot Radio Corporation, The Radio Craftsmen, Incorporated, and Wells-Gardner & Co., manufacturers of radio and television receivers and equipment; Sightmaster Corporation, which was also a manufacturer of television receivers and equipment until production was discontinued by reason of the order of the Commission under review; Local 1031, International Brotherhood of Electrical Workers, AFL, a labor union whose members are primarily employed by manufacturers of television receivers, parts and equipment and whose members are owners of television sets affected by the order; and Television Installation Service Association, an association of small business men engaged in the installation and servicing of television receivers (R. 790-92, 864).

Appellees moved for summary judgment and dismissal of the complaint on the ground that there was no genuine issue as to any material fact and that appellees were entitled to judgment as a matter of law (R. 437-38, 864).

A three-judge court was convened as required by Title 28, United States Code, Sections 2284 and 2325 (62 Stat. 968, 970). On the issues thus presented, the matter came on for hearing and oral argument was heard on November 14, 15, and 16, 1950 (R. 864).

At the conclusion of the hearing, the court took the conflicting motions under advisement and at the same time entered a temporary restraining order "restraining and suspending until further order of this court the promulgation, operation and execution of the order of the Federal Communications Commission adopted October 10, 1950, effective November 20, 1950" (R. 792-93, 865).

On December 22, 1950, and January 23, 1951, the District Court, by a 2-1 vote, entered orders granting summary judgment in favor of the appellees and against the appellants, including the plaintiff-appellants, and dismissing the complaints, including the intervening complaints (R. 878-79, 882-83). The court unanimously continued in effect the temporary restraining order until April 1, 1951, or until terminated by this Court. The court also unanimously readopted the findings and conclusions theretofore made in support of the temporary restraining order (R. 793-96, 878, 882).

Although the majority of the District Court granted summary judgment in favor of the appellees and dismissed the complaints, the most significant aspect of its decision lies in the fact that the District Court did not decide many of the determinative issues involved either in favor of appellants or in favor of appellees (R. 863-79). Certain arguments of appellants were mentioned and rejected. Others were not mentioned at all. The arguments of appellees

were mentioned and their validity questioned. And the District Court did not find or hold that the order was supported by substantial evidence.

The District Court was apparently motivated in this respect by the fact that appellees urged the District Court to speed the case to this Court. Thus the District Court stated:

> ". . . in studying the case, we have been unable to free our minds of the question as to why we should devote the time and energy which the importance of the case merits, realizing as we must that the controversy can only be finally terminated by a decision of the Supreme Court. This is so because any decision we make is appealable to that court as a matter of right and we were informed during oral argument, in no uncertain terms, that which otherwise might be expected, that is, that the aggrieved party or parties will immediately appeal. In other words, this is little more than a practice session where the parties prepare and test their ammunition for the big battle ahead." (R. 866)

That part of the District Court's opinion which states the basis for its decision reads as follows:

> "Thus, as we evaluate the situation, there are two courses open, (1) to allow defendants' motion for a summary judgment, and (2) to vacate the order and send the proceeding back to the Commission for further consideration in view of recent developments in the color television field as well as the rapidly changing economic situation. A pursuance of the latter course, assuming we have such authority, of which there may be doubt, would inevitably result in the prolongation of the controversy which badly needs the finality of decision which can be made only by the Supreme Court. In other words,

the interests of all, so we think, will be better served with this controversy on its way up rather than back from whence it comes." (R. 875)

Specification of Errors.

The United States District Court for the Northern District of Illinois, Eastern Division, erred:

1. In failing to hold that the order of the Commission is contrary to law and is not supported by the Commission's conclusions, by its findings or by substantial evidence.

2. In failing to hold that the refusal of the Commission to permit the commercial broadcasting of compatible color television systems in competition with incompatible color systems exceeds the Commission's lawful jurisdiction and is not supported by the Commission's conclusions or its findings or by the evidence.

3. In failing to pass on many of the important issues presented to it for determination.

4. In holding that it was without power to consider evidence submitted to it for the purpose of determining whether such evidence should have been considered by the Commission.

These errors are discussed with greater particularity immediately hereafter. For a full listing of the errors specified on this appeal, the Court is respectfully referred to the appellants' Assignment of Errors (R. 886-92).

Summary of Argument.

I.

The adoption by the Commission of television transmission standards which cannot be received on any of the 12,000,000 receivers now in the hands of the public violates the statutory standard of the "public interest, convenience or necessity" as construed by the Commission itself.

As early as 1940 the Commission adopted the principle that the public interest required the fixing of television transmission standards which permit all receivers to obtain pictures from all transmissions, which permit the highest quality of service known to the art while leaving ample room for all foreseeable improvements, and which are adopted only after the potentialities of basic research have been fairly explored.

Each of these principles is of first importance to the public. Compatibility has in fact became a practical necessity by virtue of the fact that 45,000,000 people now receive television service on 12,000,000 receivers, and only after expensive adaptation could these 12,000,000 sets receive any picture whatsoever under the order of the Commission.

All of the principles by which the Commission has heretofore given specific content to the standard of the "public interest, convenience or necessity" are violated by the order under review. This has been done although it is clear from the record as a whole that color television can be made available to the public without violating these principles.

II.

The Commission's record in this case is concededly inadequate and its findings and the order purportedly based thereon are not supported by substantial evidence.

This is a case in which the Commission has in its own words acted on the basis of "speculation and hope". In its First Report, the Commission purported to evaluate both the RCA system and the CBS system, *but it did not adopt either.* It stated that it should have additional information with respect to important matters, as otherwise it would be

> "compelled to speculate as to an important basis for its decision . . ."

and that

> "the Commission's determination on an important part of its decision would be based on speculation and hope . . ." (R. 165)

Thus, the Commission conceded in its First Report that the record before it was inadequate to enable it to discharge its duties. The Commission nevertheless in its Second Report adopted the CBS system on this same concededly inadequate record. No additional evidence whatsoever on these matters was taken or considered.

Furthermore, the Commission in many instances relied squarely upon clearly superseded and outmoded evidence which can in no sense be considered as substantial.

It is clear on the basis of a review of the record "as a whole" that the action of the Commission cannot be sustained. *Universal Camera Corp.* v. *National Labor Relations Board,* 19 U. S. L. Week 4160 (U. S. Feb. 26, 1951); *National Labor Relations Board* v. *The Pittsburgh Steamship Co.,* 19 U. S. L. Week 4136 (U. S. Feb. 26, 1951).

The "basic findings" which the Commission made in adopting the CBS system and rejecting the RCA system are not supported by substantial evidence. Furthermore, it is

apparent from the omissions from the criteria for the selection of a color system set by the Commission after the hearings, that the ones selected were tailored to make possible the adoption of the CBS system. There is no support in the record for the omission of other and more important criteria which would have precluded the adoption of the CBS system. These are compatibility, high resolution (picture detail), unlimited picture size, absence of flicker, and effectiveness of channel utilization. The record establishes the paramount importance of these omitted criteria.

III.

The Commission has departed from the principle it followed for over a decade that there should be a single set of standards for television and has adopted multiple or competitive "standards." In taking this action, however, it limited the area of competition by excluding compatible color. Its Reports contemplate that the present system of black and white must face competition with CBS black and white. But CBS color is immunized from competition with compatible color.

The uncontradicted fact is that the broadcasting of compatible color would hurt nobody. Having abandoned the principle of standardization for one of competition, the Commission cannot lawfully limit the area of competition to exclude compatible color. The general policy of the Communications Act, as it relates to broadcasting, is one of competition. *Federal Communications Commission* v. *Sanders Brothers Radio Station,* 309 U. S. 470.

The Commission made no findings that competition between color systems for public approval and acceptance should not be permitted. Administrative action is legally valid only if based on findings. *Ashbacker Radio Corp.* v.

Federal Communications Commission, 326 U. S. 327; *United States* v. *Carolina Freight Carriers Corp.*, 315 U. S. 475.

It does not appear that the Commission even considered whether there was any middle ground between the exclusive adoption of an incompatible color system and the exclusive adoption of a compatible system, such as permitting the broadcasting of both compatible and incompatible color in competition with each other. Before the Commission could rule out compatible color completely, such alternative consideration was required by it under the decision of this Court in *Jacob Siegel Co.* v. *Federal Trade Commission*, 327 U. S. 608.

This is particularly true in a case such as this, where the action of the Commission has the effect of suppressing scientific development, which in turn involves the stultification of the priceless national resource of invention and research.

IV.

The Commission violated its duty under the Communications Act and the Administrative Procedure Act to keep itself informed and to take account of determinative facts. The Commission in other situations has expressly recognized that it would be a violation of its obligations under the Communications Act to disregard any facts relating to the proper exercise of its duty to fix television transmission standards. In this case, however, the Commission refused to consider information of controlling significance concerning scientific developments which was submitted to it after the testimony was completed on May 26, 1950 but prior to the issuance of its order on October 10, 1950.

Thus the Commission refused even to consider the report of the Condon Committee, the most distinguished group of scientists who have ever undertaken to study the status of color television, although their report made reference to

important facts which had not theretofore been available to the Commission. The conflict between the Commission's Reports and the Condon Report alone should have caused the Commission to inquire further before taking the action here under review.

Similarly the Commission totally disregarded the RCA Progress Report which was submitted after the close of testimony on May 26, 1950. Although the RCA Progress Report set forth facts subject to ready verification, the Commission ignored the reported facts and made findings as to what *could not be done* with the RCA system which were in substantial conflict with what the RCA Progress Report stated *had already been done.*

Appellees seek to justify the Commission's refusal to consider these reports on the ground that, in a rule-making proceeding, it would have been unlawful for the Commission to consider anything beyond the formal transcript of testimony and exhibits received in evidence at the hearings. If this position is upheld by this Court, the legislative rule-making process of administrative agencies will be encased in a strait-jacket.

The Condon and RCA Progress Reports were formally submitted by RCA to the Commission prior to its order. The Commission's failure to consider these reports was therefore also a violation of its duty under Section 4(b) of the Administrative Procedure Act to consider all relevant matter presented in rule-making proceedings.

V.

The court below in this case did not afford appellants proper judicial review of the Commission's action.

The court expressly followed a standard of judicial review which this Court has since held to be improper. *Universal Camera Corp.* v. *National Labor Relations Board,*

supra; National Labor Relations Board v. *The Pittsburgh Steamship Co., supra.* In spite of the admittedly inadequate record and appellants' contention that the Commission's action was not supported by substantial evidence, the court below failed to review "the record as a whole", and failed to rule on the question of whether the Commission's order and findings are supported by substantial evidence.

Furthermore, many other important questions involved in this case were left unresolved by the court below. It is apparent that the District Court considered the case before it, to use its own words, as "little more than a practice session", and intended to leave the decision to this Court. For all practical purposes, therefore, appellants have not as yet been given their day in court.

VI.

In adopting the CBS system the Commission relied for technical advice regarding controlling technical issues on a staff engineer who had an interest in the adoption of the CBS system. Although five of the seven members of the Commission are laymen, many of the issues were of a highly technical nature. The interested engineer participated in the decision-making process. His testimony and that of CBS was accepted and acted upon by the Commission. The testimony of independent and industry experts was disregarded. The public interest in administrative action free from any taint of interest is so great that an order arrived at under these circumstances cannot be upheld.

ARGUMENT.

POINT I.

The Adoption of the Incompatible CBS Color Television Standards Is Contrary to the Public Interest.

The guiding statutory standard for the Commission as set forth in the Communications Act of 1934, as amended, is the "public interest, convenience, or necessity". The Supreme Court has made it clear that this statutory standard is not without specific meaning and specific limitations any more than are similarly generalized standards set forth in other statutes. In *National Broadcasting Co.* v. *United States,* 319 U. S. 190, 216, the Supreme Court stated, quoting with approval from earlier decisions:

> "The Commission was, however, not left at large in performing this duty. The touchstone provided by Congress was the 'public interest, convenience, or necessity,' . . . 'This criterion is not to be interpreted as setting up a standard so indefinite as to confer an unlimited power. . . .'
>
> "The 'public interest' to be served under the Communications Act is thus the interest of the listening public in 'the larger and more effective use of radio.' §303(g)"

It is this interest of the listening public which appellants seek to vindicate. When, as here, the Commission has disregarded the very rights which it is required to protect, these rights can only be protected by the courts. As this Court said in *Scripps-Howard Radio, Inc.* v. *Federal Communications Commission:*

> ". . . But these private litigants have standing only as representatives of the public interest. [citing

> cases] That a court is called upon to enforce public rights and not the interests of private property does not diminish its power to protect such rights. 'Courts of equity may, and frequently do, go much farther both to give and withhold relief in furtherance of the public interest than they are accustomed to go when only private interests are involved.' *Virginian Ry. Co.* v. *Federation*, 300 U. S. 515, 552. . . ."
>
> *Scripps-Howard Radio, Inc.* v. *Federal Communications Commission*, 316 U. S. 4, 14-15.

It is only necessary to consider the nature of the public interest which the Commission is required to serve to uncover the lack of support for the Commission's order.

The Communications Act of 1934 itself provides the most important assistance in this quest. The pertinent parts of Section 303 read as follows:

> ". . . the Commission from time to time, as public convenience, interest, or necessity requires shall—
>
> • • • • • • • •
>
> (g) Study new uses for radio, provide for experimental uses of frequencies, and *generally encourage the larger and more effective use of radio* in the public interest;"

In its Report of May 28, 1940, which was occasioned by the Commission's refusal to authorize commercial black and white television at that time, the Commission analyzed the public interest with respect to television regulation. This required it to determine the practical course which television regulation must follow to promote the *larger* and *more effective* use of radio. It found that the public interest required the fixing of television transmission standards which:

(a) permit all receivers to obtain pictures from all transmissions, thus providing a "standard gauge" and assuring continuity of service to the public;

(b) permit the highest quality of service known to the art while leaving ample room for all foreseeable improvements; and

(c) are adopted only after the potentialities of basic research have been fairly explored and the industry is in substantial agreement upon them.

A. "The Standard Gauge".

The Commission found that the larger and more effective use of radio in the field of television could only result if a single uniform system was established. The Commission said:

> "Transmission standards may be simply defined as engineering rules governing the characteristics of the radio signal transmitted by the operation of radio apparatus. Such standards as a practical matter must require a fair degree of efficiency and assure to the public in basic outline a single uniform system of broadcasting *which will enable every transmitting station to serve every receiver within its range.*
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> • • • • • • •
>
> " 'However, *a serious question of public interest would arise in the future if the Commission should specify external transmitter performance capabilities differing from the operating capabilities of receivers in the hands of the public.* This is because of the resultant possibility that the public's receivers would be incapable of receiving programs emanating from transmitters licensed by the Commission.'
>
> • • • • • • •

> "It would be a violation of its statutory obligations for the Commission to disregard any facts which might foreclose a proper exercise of its duty to fix transmission standards for a single uniform system of television broadcasting.
>
> • • • • • •
>
> "At the same time these basic standards—the standard gauge they may be termed—should afford within their limits reasonable flexibility for future advances in the science of television broadcasting." (pp. 2, 5, 19, 27-28)

The basic authority of the Commission lies in the necessity to prevent electrical interference between broadcasting stations. The exercise of this authority involves the allocation of particular frequencies to particular services and the licensing of broadcasters to use such frequencies in certain locations.

On the other hand, no express authority for the setting of transmission standards is to be found in the Communications Act of 1934. However, no one has questioned the desirability of achieving the results described by the Commission in its May 28, 1940 Report, namely, to provide:

> ". . . a fair degree of efficiency and assure to the public in basic outline a single uniform system of broadcasting which will enable every transmitting station to serve every receiver within its range." (p. 2)

As stated in appellees' Motion to Affirm, the Commission has heretofore adopted technical transmission standards which have assured that the public would receive a uniform satisfactory service (p. 3). There has always been a single set of standards for regular commercial operation of the particular service involved in the use of a particular set of channels (p. 19). Appellants urged this fact upon the

court below and quoted extensively from the Commission's own Reports of May 28, 1940 and of March 18, 1947, which were concerned with television transmission standards.

Both in the court below and before this Court the appellees seek to distinguish these prior Commission Reports by pointing out that in 1940 and in 1947 it was contemplated that color broadcasting might require different standards from black and white.

What the Commission has failed to point out either to this Court or to the court below are the facts that:

1. In 1940 there were virtually no television receivers outstanding, and very few in March 1947;

2. In so far as it was contemplated in 1947 that color broadcasting might require different standards from black and white, it was also contemplated that color television occupy a *different portion of the radio frequency spectrum* than the black and white service;

3. In contrast, it is now accepted that color television will occupy the *same portion of the radio spectrum* as the existing television service; and

4. Not until millions (let alone the present billions) of dollars were actually invested by the public in television receivers did compatibility become a practical necessity.

Indeed, appellees' attempt to deny the plain facts of life so far as radio and television are concerned is also to be contrasted with the testimony of the President of CBS in these hearings:

> "Normally in the field of radio and television, *when a consumer buys a receiver he knows that he can, in general, get all the signals in his area. That has usually been considered as the purpose of standards.*" (Tr. 7117)

In addition, appellees' Motion to Affirm expressly admits that the purpose of the Commission in adopting transmission standards is to ensure that there will always be a single set of standards for the regular commercial operation of the particular service involved (p. 19). In spite of this, the principle that every television transmitter must be receivable by every television receiver within its range has been discarded by the order. The order of the Commission here under review for the first time in the history of the federal regulation of radio provides for two incompatible sets of operating standards for a single set of channels* (R. 558-60, 579-81, 608-09; *cf.* Tr. 4734).

B. Efficiency and Room for Improvement.

The Commission can only discharge its statutory obligation to encourage the larger and more effective use of radio if the standards adopted provide for as high a level of service as is known to the art and leave room for all the foreseeable improvements in the art (R. 108, 558-59, 562-69;

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* Appellees cannot fairly claim that color television is a separate service from black and white television. That they are not separate was conceded as early as 1940 by Dr. Goldmark of CBS who stated:

> "I recommend we stop making a distinction between color and black and white." (Official Minutes of 8th Meeting—Part I of Panel 1, NTSC, p. 14, December 11, 1940. The proceedings of Panel 1 were submitted as Exhibit 254 in Docket No. 5806, at p. 2303.)

Only if color and black and white television had been assigned to different portions of the radio spectrum could they be regarded as two different services. Thus, AM and FM sound broadcasting, which are not compatible with each other, occupy entirely different portions of the radio frequency spectrum. In addition, although it is possible for a broadcaster to broadcast simultaneously both in AM and FM, it will not be possible to broadcast simultaneously on existing television standards and on the incompatible CBS standards because of the shortage of space in the frequency spectrum.

Tr. 7974-76, 7984, 8113, 9405, 9497). Thus the Commission also said in its 1940 Report:

> "In its regulation of television in the public interest, the Commission, in the light of the evidence before it, has set as its goal unfettered technical development and engineering advance. In dealing with the problem of setting television transmission standards the Commission has, therefore, sought to avoid action which would freeze the state of the art at an unsatisfactory level of performance." (p. 3)

In rejecting the CBS system in 1947 the Commission elaborated further on this point:

> "Before approving proposed standards, the Commission must be satisfied not only that the system proposed will work, but also that the system is as good as can be expected within any reasonable time in the foreseeable future. In addition, the system should be capable of permitting incorporation of better performance characteristics without requiring a change in fundamental standards. Otherwise, the danger exists that the standards will be set before fundamental developments have been made, with the result that the public would be saddled with an inferior service, if the new changes were not adopted, or if they were adopted, receivers already in the hands of the public would be rendered useless."*

C. Encouragement of Research—Avoidance of Premature Standards.

Neither the larger nor the more effective use of radio in the television field would result if the standards chosen should be proven wrong by later research. The nature of

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* FCC, REPORT OF THE COMMISSION IN THE MATTER OF PETITION OF COLUMBIA BROADCASTING SYSTEM FOR CHANGES IN RULES AND STANDARDS OF GOOD ENGINEERING PRACTICE CONCERNING TELEVISION BROADCAST STATIONS, Docket No. 7896, 11 F. C. C. 1523, 1525 (March 18, 1947).

standards demands that they should only be fixed after a full investigation of possibilities and with substantially unanimous agreement within the industry as their basis. In its 1940 Report the Commission also said:

> "The keynote of the Commission's report and the policy underlying the Commission's rules was that television broadcasting was still in an experimental stage and that in view of evidence revealing a substantial possibility of significant improvements in the art, 'research should not halt' and 'scientific methods should not be frozen in the present state of the art.' The Commission expressed the belief that the crystallization of standards at the current level of the art, by whatever means accomplished, would inevitably stifle research in basic phases of the art in which improvement appeared promising.
>
> * * * * * * *
>
> ". . . Premature crystallization of standards will, as has thus been pointedly illustrated to the Commission, remove the incentive for technical research toward higher levels of efficiency. If technical research having this goal is retarded or halted, the Commission's duty to fix transmission standards with due regard for considerations of public interest will have been, for all practical purposes, nullified.
>
> "It is, therefore, the conclusion of the Commission that in order to assure to the public a television system which is the product of comparative research on known possibilities, standards of transmission should not now be set. It has further been decided that there should be no commercial broadcasting with its deterring effects upon experimentation until such time as the probabilities of basic research have been fairly explored. . . . As soon as the engineering opinion of the industry is prepared to approve any one of the competing systems of broadcasting as the standard system the Commission will consider the authorization of full commercialization. . . .

> "It may be expected that industry opinion will insist upon such standards as will give definite assurance of satisfactory performance and of continuity of service for the public comparable to the continuity of service displayed in the past history of the radio industry. At the same time these basic standards—the standard gauge they may be termed—should afford within their limits reasonable flexibility for future advances in the science of television broadcasting." (pp. 13, 26-28)

The force of administrative practice and construction in determining the legal content of a statutory standard which would otherwise be vague has repeatedly been recognized and relied upon by this Court. For example, in *Norwegian Nitrogen Products Co.* v. *United States*, 288 U. S. 294, 315, the Court stated:

> " . . . True indeed it is that administrative practice does not avail to overcome a statute so plain in its commands as to leave nothing for construction. True it also is that administrative practice, consistent and generally unchallenged, will not be overturned except for very cogent reasons if the scope of the command is indefinite and doubtful. . . . The practice has peculiar weight when it involves a contemporaneous construction of a statute by the men charged with the responsibility of setting its machinery in motion, of making the parts work efficiently and smoothly while they are yet untried and new."

On another occasion the Court said in deciding a question of statutory interpretation of the Motor Carrier Act:

> " . . . In any case such interpretations are entitled to great weight. This is peculiarly true here where the interpretations involve 'contemporaneous construction of a statute by the men charged with the

responsibility of setting its machinery in motion, of making the parts work efficiently and smoothly while they are yet untried and new.' " [Citing *Norwegian Nitrogen Products Co.* v. *United States*, 288 U. S. 294, 315 (1933).]

United States v. *American Trucking Associations*, 310 U. S. 534, 549.

The criteria which the Commission laid down in 1940 for the adoption of television standards have been accepted as valid for a decade by the industry. They are the principles which establish the content of the public interest, convenience, and necessity in the adoption of commercial television broadcasting standards. They were arrived at as a result of the "contemporaneous construction of a statute" by the men charged with the responsibility of setting the television industry in motion within the meaning of the *Norwegian Nitrogen* case. They were reaffirmed again in 1947 and they have not been departed from by the Commission until the promulgation of the order.

D. Violation of the Public Interest.

In 1947 the Commission applied these criteria to the color television system then proposed by CBS (a system substantially superior in performance to that now adopted), and found that its adoption was *not* in the public interest. Since then CBS has changed its system in the direction of lower quality (Tr. 5558-59, 8898-8900). Its adoption violates each of the three criteria for television standards previously specified by the Commission, and, therefore, blocks that *larger* and *more effective* use of radio which the Commission has been commanded by Congress to promote.

The adoption of CBS color television standards does not permit the highest quality of color service known to the art, nor leave room for foreseeable improvements in service

(Tr. 2529-30, 4861-64, 5328, 5555, 6503-04, 6901, 7985-86; Exhibit 384, p. 5).

The adoption of CBS color television standards does not permit all receivers to obtain pictures from all transmissions (R. 147, 359, 575, 794, 876; Tr. 3411, 4612, 4750-51, 4829, 5134, 6442, 6546, 9962, 10022). The order instead deliberately splits the television broadcasting service and deprives the public of continuity of service (R. 558-60, 580-81, 608-09, 794). The order creates a narrow gauge for television transmissions when the standard broad gauge is already available.

The adoption of CBS color television standards is contrary to the recommendations of virtually the entire television industry (R. 162-63, 560, 581, 589; Tr. 2529-30, 3896, 4849-50, 5499, 5903, 7974-76, 8095, 8199-200, 8266, 8385-86, 9397, 9495, 9696, 9866, 10046-47, 10057).

The potentialities of basic research which would make an all-electronic, high-definition, compatible color television system available to the public have not been fairly explored by the Commission. In fact, the Commission has refused even to look at many of the results of this research (R. 165-66, 408-12, 419-20, 428-31, 592-95, 871-72, 879-81; *cf.* Motion to Affirm, p. 21).

If the public interest, convenience, and necessity as set forth in the Communications Act of 1934 has any meaning whatever with respect to the adoption of commercial television broadcasting standards, and this Court has said it must have meaning, the Commission has exceeded its jurisdiction, and has contravened the public interest.

Not only has the Commission turned its back on the abundant promise and achievement of electronic science and refused even to look at its accomplishments;

Not only has the Commission retrogressed from the goal of high-quality standards which leave the fullest room for continued improvement;

The Commission has gone further, and, in an effort to accomplish a *tour de force* of administrative law, has sought to change the most compelling reason for the rejection of the CBS system—its incompatibility—into the sole reason for its adoption now. That is what the First Report and the bracket standards proposal most clearly reveal.

Unless conscience and common sense rebelled against the adoption of a ten-year old, degraded, incompatible system, which had at least once been rejected, there would have been no First Report and no proposal for bracket standards. There would have been only a final report.

Nowhere have appellees denied the validity of the principles governing standards set forth above. Nor does the Commission even claim that the adoption of the CBS system squares with those principles.

Hoped-for refuge is taken instead in the existence of a "record" and in rubrics relating to administrative finality and the limitations on judicial review.

These will be discussed below. The point appellants wish to make here is that no "record" and no refuge in the rubrics of administrative law can hide the fact that the order here under review flatly violates every principle to be found in the Act or heretofore expressed by the Commission with respect to television transmission standards.

POINT II.

The Commission's Record Is Concededly Inadequate and the Action of the Commission Is Not Supported by Substantial Evidence.

The action of the Commission in adopting the incompatible CBS system and rejecting the RCA system constitutes a clear violation of established law requiring that administrative action, findings and conclusions be based on substantial evidence.

In the instant case, it is submitted that the decision of the Commission cannot be sustained since it cannot be found on review of "the whole record" that "the evidence supporting that decision is substantial, when viewed in the light that the record in its entirety furnishes." *Universal Camera Corp.* v. *National Labor Relations Board,* 19 U. S. L. Week 4160 (U. S. Feb. 26, 1951); *National Labor Relations Board* v. *The Pittsburgh Steamship Co.,* 19 U. S. L. Week 4136 (U. S. Feb. 26, 1951).

A. Admitted Inadequacy Of Administrative Record.

This is a case in which the Commission has in its own words acted on the basis of "speculation and hope" (R. 165).

The First Report of the Commission makes it clear that this is not a case in which the Commission can claim that the record supports its order. Indeed, the Commission cannot properly claim even to have completed such a record.

The CBS incompatible color system dates back to 1940 (Tr. 8885-86). It was rejected by the Commission in 1947 for defects which it still has, as well as because it required 16 megacycles to give picture detail comparable to that provided by existing television standards.* In the present 6-megacycle channels, the CBS system has less than half the picture detail of the existing black and white standards (R. 360, 575-76, 584, 795).

The RCA compatible all-electronic color television system is relatively new (Tr. 2655-60; Exhibit 206, pp. 2-3, Exhibit 209, p. 1). This system utilizes principles of the RCA simultaneous system first demonstrated in 1946 which required 14 megacycles (Tr. 2659, 2812). The development of the RCA color system to the point where it operates in

* FCC, REPORT, March 18, 1947, 11 F. C. C. 1523.

a 6-megacycle channel, without sacrificing picture detail, took place in 1949 (Tr. 2658-60).

As successively demonstrated during the hearings, and since, the RCA system has improved in practical operation tremendously. This is conceded by all (Tr. 6130-31, 7994, 8516, 8611, 8882, 9619, 10002, 11282).

On the other hand, the CBS incompatible system has remained basically as it was in 1940 (Tr. 8885-86). A mechanical disc is still used, with its inherent limitations on picture size, rather than electronic means, to produce color (Tr. 3137, 3170-71).

In this state of affairs, the Commission issued its First Report of September 1, 1950, the taking of testimony having ended in May, 1950. In this Report, the Commission purported to evaluate both systems, *but did not adopt either.*

As indicated, the RCA system was new. Nevertheless it had solved the all-important problem of compatibility (R. 149, 573). In addition, RCA had only late in the hearings developed and demonstrated the tri-color picture tube, one of the greatest inventions in the electronics art (Tr. 7989, 7994, 8130-32, 10040, 11282; Exhibit 382).

Accordingly, the Commission, recognizing that "fundamental research cannot be performed on schedule" and that "much of the fruit of this research is only now beginning to emerge", stated in its First Report that it wished more time before freezing standards for color (R. 165-66).

As Commissioner Hennock stated (R. 192):

> ". . . it has been decided by this Commission that the most desirable course to follow would be to allow more time for the development of all color systems, including the CBS field sequential system".

This conclusion was in accord with the Commission's consistent past practice and with the mandate of the Communications Act of 1934.

In refusing to adopt television standards in 1940, the Commission stated in its Report of May 28 of that year:

> "It would be a violation of its statutory obligations for the Commission to disregard any facts which might foreclose a proper exercise of its duty to fix transmission standards. . . ." (p. 19)

This principle of administrative construction was reaffirmed by the Commission in its Report of March 18, 1947, which rejected the CBS system. The Commission then said:

> "Before approving proposed standards, the Commission must be satisfied not only that the system proposed will work, but also that the system is as good as can be expected within any reasonable time in the forseeable future." (11 F. C. C. 1523, 1525)

On the other hand, the Commission in this case also found defects in the CBS incompatible system, ten years old and at least once rejected as it was, which the Commission thought should be overcome before adoption, even assuming that an incompatible system should in any case be adopted. These limitations were susceptibility to flicker, low picture detail, and limited picture size (R. 163-65).

The Commission stated *as to all three of these limitations** that the adoption of the CBS system would mean that the Commission was

> "compelled to *speculate* as to an important basis for its decision . . ."

and that

> "the Commission's determination on an important part of its decision would be based on *speculation and hope*. . . ." (R. 165).

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* Not, as appellees' Motion to Affirm said, only as to the limitation on picture size (p. 16). See First Report, ¶¶146-47 (R. 165).

Seven performance characteristics were considered by the Commission in its First Report in evaluating the color systems proposed (R. 129, 135, 137, 140, 142, 143, 145). The Commission's Report expressly recognized in connection with the CBS system that further information was required with respect to each of these seven performance characteristics (R. 130-31, 134, 136-137, 139, 140-41, 142-43, 144, 145).

In spite of these clear statements that a decision could not properly be made without further information and further opportunity for the development of all systems, the Commission on October 10, 1950 adopted standards for the CBS incompatible system

> (1) without taking any further evidence as to the CBS system,
>
> (2) refusing to consider further information with respect to the RCA system, and
>
> (3) without according opportunity for further development.*

Thus the Commission has conceded and admitted in its First Report that the record of the hearings before it was inadequate to enable it to discharge its duties. The Commission nevertheless in its Second Report went ahead and adopted the CBS system on this same concededly inadequate record. No additional evidence whatever was taken.

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* This is to be contrasted with the Commission's action in other cases. *In re Applications of the Lake Huron Broadcasting Co. (WKNX) and WKMH*, Docket Nos. 9360 and 9568; PIKE AND FISCHER, 6 R. R. 875, 877, 878. On December 8, 1950 in that proceeding the Commission approved an order reopening the record to take further evidence so that the Commission could have

> "a sounder, more accurate and scientific basis"

for decision and so that

> "certainty can replace speculation."

In this connection the majority of the District Court said of the Commission's refusal to consider further evidence (R. 871-72):

> "Admittedly, much progress was made during the latter portion of the hearings and, as claimed, after the hearings closed, in the development of a compatible system of color television. Particularly was such progress made by RCA, and as we view the situation the most plausible contention made by plaintiffs is that the Commission abused its discretion in refusing to extend the effective date of its order so that it might further consider the situation, and particularly the improvement which it is claimed had been made by RCA and others."

In dissenting from the decision of the District Court, Judge La Buy stated (R. 881):

> "... it is difficult to understand why the Commission refused to hear additional evidence and chose instead a course of action, using its own words, based 'on speculation and hope rather than on demonstrations.'"

Furthermore, in so far as the Commission made findings based upon evidence in the record, it in many instances relied squarely upon clearly superseded evidence in reaching its result. In a situation of this kind where a dynamic science is involved, it is clear that findings which are based upon superseded evidence cannot be findings based upon substantial evidence.

As stated by the majority of the District Court:

> "... a number of critical findings [of the Commission] are based upon evidence which was taken in the earlier stage of the proceeding which is not representative of the situation as it existed at the time the findings were adopted." (R. 871)

If the court below had applied to the Commission's decision the proper standards of review which have since been enunciated by this Court, the court below could not in the words of this Court "conscientiously find that the evidence supporting that decision is substantial, when viewed in the light that the record in its entirety furnishes". *Universal Camera Corp.* v. *National Labor Relations Board*, 19 U. S. L. Week 4160 (U. S. Feb. 26, 1951).*

In fact, the Commission itself in its First Report held that the record considered in its entirety did not warrant final action. Notwithstanding that admitted inadequacy, and without considering any additional evidence whatsoever, the Commission in its Second Report went ahead and took final action adopting the CBS system exclusively.

B. Lack of Substantial Evidence To Support The Commission's findings.

1. The CBS Color Television System.

a. CBS Limitation on Picture Size.

As stated by the District Court, the Commission made five so-called "basic findings" with respect to the CBS system.**

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* In the *Universal Camera Corporation* case, this Court noted that the Seventh Circuit had followed a standard of judicial review contrary to that which this Court has now held to be proper. The three cases cited by the court below which it stated "so firmly delineated" its "scope of review" were all decided prior to the passage of the Administrative Procedure Act, the statute which has enlarged the scope of judicial review with respect to substantial evidence.

** These appear in the Opinion of the District Court (R. 869-70). They were apparently taken by the court below from the CBS Memorandum filed with that court and are not exact quotations from the Commission's Reports and order. They are, however, a fair composite of what the Commission said in its First and Second Reports.

One "basic finding" with respect to the CBS system is:

> "that while as a practical matter the apparatus now used by the CBS system is limited either to projection receivers of unlimited size or direct-view pictures of 12½ inch size, this size limitation will be eliminated if and when a commercial tri-color tube is successfully developed, and that in any event the public might well prefer a 12½ inch color picture to a 16-inch black-and-white picture and should not be deprived of that choice" (R. 870).

The reason for the limitation on the size of CBS color pictures to 12½ inches is inherent in the disc-type apparatus proposed by CBS. This is due to the fact that a disc larger than 26 inches in diameter whirling at the high speed of 1440 revolutions per minute is not considered practical (R. 150, 602; Tr. 3217-18, 3237-38, 5102, 8978-79, 9180-84, 9349-54). And the diameter of the disc must be somewhat more than twice that of the picture tube in front of which it is set up (R. 150, 602; Tr. 3217).

With respect to this CBS limitation, the Commission stated in its First Report that it should have further evidence in order to avoid acting on "speculation and hope" (R. 164-65). No such evidence was taken.

The statement that the public "might well prefer a 12½ inch color picture to a 16 inch black and white picture" is to be contrasted with the fact that 90% of the sales in black and white television receivers today are of 16 inch or larger sizes (R. 602, 870). There is no limitation on black and white pictures to 16 inches (or on RCA color pictures) and it is common knowledge that 16 inches is becoming the *minimum* size today (*cf.* Tr. 4306-07). A great volume of sales is in sizes above 16 inches.

The CBS testimony on which the Commission based the finding that a 12½ inch color picture is something that the

"public might well prefer" is very much different from the CBS position in 1944 that an 18 inch screen was

> ". . . the size most folks seem to want in their living room". (Tr. 9209)

Similarly, CBS in 1944 took the position that

> "The picture must be larger [than 7½ by 10 inches] if the television set is to provide entertainment for a whole family or for friends." (Tr. 9210-13)

A picture of 7½ by 10 inches is substantially that produced by the 12½ inch tube of today.*

Commissioner Sterling, formerly Chief Engineer of the Commission, strongly dissented from the majority of the Commission in this respect. He stated, and the record as a whole will not support a contrary conclusion (R. 429):

> "I believe that the rapid acceptance by the public of receivers incorporating larger sized black and white tubes as they moved from 7" to 10" to 12", then to 16" and 19" clearly indicates the preference of the public for large size TV pictures and they will not be satisfied with smaller pictures because they are in color."

The majority of the Commission are setting their "speculation and hope" as to the possible satisfaction of the public with midget sized television against the demonstrated preference of the public for large screen television.

It is as if the Commission had standardized on the four cylinder car when the public was almost unanimously purchasing six and eight cylinder cars.

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* Television picture sizes are now expressed in terms of the diagonal of the picture rather than by width or height.

b. CBS Susceptibility to Flicker.

Another "basic finding" with respect to the CBS system is:

> "that though the CBS system is susceptible to flicker to a greater degree than standard black-and-white, the problem is not serious since flicker, which results from brightness, does not appear at the brightness level which is adequate for home use" (R. 869-70).

It will be noted that this finding, like others, starts with an admission and an apology for the CBS system. The finding thus concedes that the CBS system is susceptible to flicker to a greater degree than standard black and white.

This susceptibility of the CBS system to flicker is another defect on which the Commission, in its First Report, said it should have further evidence as to whether and how it might be overcome (R. 163, 165). Otherwise the Commission said its decision on this point would be "based on speculation and hope" (R. 165).

It has been conceded by CBS that with its disc-type receivers the maximum brightness that can be enjoyed without flicker at the most favorable viewing distance is 18½ footlamberts (Tr. 8964).

The inadequacy of this order of brightness is indicated by a study conducted by a committee of three engineers, one of whom is now the Chief Engineer of the Commission. This committee, on the basis of a side-by-side comparison, selected as the maximum brightness useful for television the figure of 1400 footlamberts and the minimum brightness 30 footlamberts, with preferred values near the maximum. (Docket 7896; Tr. 418-19, 431-32; Exhibit 21, pp. 127-146)*

* The record in Docket No. 7896 was incorporated by reference in the proceedings here under review at the request of CBS (Tr. 2004-05).

During a demonstration before the Commission of the CBS system, Dr. Goldsmith of DuMont Laboratories stated regarding CBS color receivers operating at a brightness of only 18 footlamberts:

> "From where I am sitting, approximately 15 feet from the receiver, there is a very perceptible flicker on this picture." (Tr. 3327)

Adrian Murphy of CBS had no alternative but to agree:

> "Well, there should be." (Tr. 3327)

Dr. DuMont testified that

> ". . . you cannot get a bright enough picture without flicker in the CBS system . . ." (Tr. 9499)

Dr. Lee De Forest, the famous pioneer in electronics, also testified with respect to inadequate picture brightness in the CBS system. He stated:

> "The disadvantage of the Columbia system is it is a color subtractive, so there is an enormous loss of light as there is in any subtractive filter system." (Tr. 5897)

The significance of flicker and brightness in selecting standards was emphasized in the testimony of Mr. Fink. He stated:

> ". . . if the . . . [British] public could see how much brighter the American television pictures are, because they are 60 fields per second and not 50 fields per second* . . . they might not be so satisfied with the decision which the Government of Britain made in 1936, and I think that *it is important for a*

* The CBS system has the equivalent of even less than 50. It has 48 fields per second (R. 132, 585).

commission not to take what the public is willing to accept, but what the public would like to accept if it knew the alternatives." (Tr. 7977-78)

Mr. Fink pointed out how fortunate we were in having adopted American standards for black and white television which put a high ceiling on brightness. He stated:

"We did not know that we were going to have pictures as bright as we now find the public actually demands." (Tr. 7981)

Flicker is a problem of fundamental engineering limitations in the CBS system (R. 360-61, 585-86; Tr. 4037, 5088, 5618). In the hearing this point was clearly made by the Motorola company, a large television receiver manufacturer:

"The CBS system is faced with a continuous compromise between flicker and definition and the requirements for an acceptable system cannot be achieved within the limitations of a 6 Mc. bandwidth and compatibility.

• • • • • •

"Motorola, Inc. maintains a television research laboratory under the direction of Dr. Kurt Schlesinger and active projects include several confidential programs looking toward the solution of color receiver problems. Dr. Kurt Schlesinger has a background of four years of direct engineering work with the CBS color system. A careful weighing of this and of all other Motorola experience and Institutional knowledge of color television has led to the considered decision that *the CBS system is unsatisfactory and unworthy of additional time and attention.*" (Exhibit 384, p. 5)

The great importance of the susceptibility to flicker of the CBS system is shown by the Commission's Report at

the conclusion of the 1946-1947 color hearings. At that time the Commission held:

> "In the absence of more convincing evidence on the point, the Commission is of the opinion that on the point of brightness and flicker alone, the risk of approving the Columbia standards at this time is that color television might be forced to limp along with a picture that is not sufficiently bright for general home use or is subject to objectionable flicker." (11 F.C.C. 1523, 1531)

The brightness and flicker characteristics of the CBS system which the Commission has adopted by its order are precisely the same as those of the CBS system which the Commission rejected in 1947 (R. 585-86).

It was then admitted by CBS's own expert on optics and vision, that if the effective field rate of the CBS system could have been changed to the field rate employed by the present black and white system and by the RCA color system as well, the amount of brightness which could be enjoyed without flicker could be increased by about ten times (Docket 7896, Tr. 1532).

c. CBS Picture Quality and System Equipment.

Two of the "basic findings" relate to the nature of the CBS color picture and to the CBS system equipment (R. 869).

The all-important point in respect of both of these findings is that they relate only to CBS mechanical disc apparatus. They are thus confined to apparatus which the Commission itself found was limited to direct-view picture size of 12½ inches.

The record clearly establishes the unsatisfactory nature of this type of equipment.

Dr. Charles W. Geer, Professor of Physics at the University of Southern California, testified that color receivers

> "... should not be dependent upon mechanical means of color separation or synthesis, nor upon synchronous motors, nor upon filters ..." (Tr. 3833).

Mr. S. B. Smith, testifying on behalf of CTI, stated (Tr. 4095-96):

> "In the public interest the standards established should, and must, in my opinion, exclude all but a purely electronic operation. After all, we, in the United States, are long past the so-called mechanical age. We are well along in the electronic age. We are entering the atomic age.
>
> "If this Commission goes backward and authorizes a color television system wherein a rotary disc is used as the color controlling element, it would be like reverting, in my opinion, to a Nipkow disc originating in 1884 as the image resolving element of a 1950 black and white television receiver."

Commissioner Sterling stated to a CBS witness (Tr. 6421):

> "Dr. Dunlap, I shall be very frank in stating that I am very much concerned about public acceptance of a color television system which requires a mechanical or motor driven color filter, because I have seen television, lived with it, and seen it emerge from a mechanical system to an all-electronic system."

Mr. Frank H. McIntosh, an independent consulting engineer testifying on behalf of CTI, stated (Tr. 4754):

> "... the use of a rotating disc does entail certain unavoidable disadvantages. Among these are its size, its lower resistance to flicker even at the higher field rate of the CBS system, and its inherent tendency to cause color breakup and color fringing. In

addition, there is the fundamental limitation on the size of image which can be used, a factor which necessitates the use of a magnifier with its resultant limiting viewing angle and susceptibility to specular reflections. The trend is toward larger and larger television pictures, and an upper limit of ten or twelve inches can only serve to impede the progress of the art . . . ".

That the CBS equipment is not simple to handle and to operate either from the standpoint of reception or transmission is clear.

Thus, with a CBS disc-type adapted and converted color receiver, the viewer must perform a series of operations whenever the broadcaster switches from standard black and white to CBS color. These operations are:

1. The viewer must leave his seat and walk over to the receiver;
2. The viewer must push a button or flip a switch to shift from 525 line 60 field transmission to 405 line 144 field transmission;
3. The viewer must push another button or flip another switch in order to turn on the motor to drive the disc;
4. The viewer must wait until the color wheel has reached 1440 revolutions per minute, an amount of time which will vary with the size of the motor and the size of the wheel in his particular set;
5. The viewer must use the phasing button to lock the colors in their proper sequence; and finally
6. The viewer may return to his chair and then look at the program.

These facts were finally recognized by Dr. Stanton, President of CBS, after prolonged cross-examination (Tr. 8658-71; *cf.* 8978-79, 9349-54).

d. CBS "Geometric Resolution." (Lack of Picture Detail)

Another "basic finding" with respect to the CBS system is:

> "that while the CBS system has less 'geometric resolution' than black-and-white, the addition of color more than outweighs this loss, and that the black-and-white pictures produced from CBS color are acceptable" (R. 870).

This finding admits the CBS system has less resolution or picture elements than black and white, but says color makes up for this.

Actually CBS color has about 80,000 picture elements compared with 200,000 for standard black and white (R. 360, 575-76; Tr. 5328). *RCA color also has 200,000 picture elements* (R. 367, 584). These figures eloquently tell the story of why the Commission, in its First Report, said it wanted further evidence on whether and, if so, how this deficiency in the CBS system could be overcome. But no such evidence was taken. And the defect was not overcome.

It is claimed that this deficiency in picture elements is balanced out by the addition of color. But only a color system in which color is a *plus* factor rather than a balancing factor can satisfy the Commission's obligation to promote "the *larger* and *more effective* use of radio in the public interest".*

As Mr. McIntosh, a consulting engineer retained by CTI, testified:

> "Such a subjective improvement in apparent resolution, however, can scarcely be used as an excuse to degrade basic picture quality any more than is necessary. The radio frequency spectrum is one of our greatest natural resources and any system

* Section 303(g) of the Communications Act.

> that unavoidably cuts its utilization in half, or more, represents a distinct waste and should certainly be avoided if at all possible." (Tr. 4743-44)

This is in accord with the position of Dr. Goldmark of CBS in the past that picture detail is as important in a color system as in a black and white television system. Dr. Goldmark, as chairman of an industry sub-committee, signed a report in 1946 stating that (Tr. 8894-95):

> "The sub-committee felt that a color television system should have the same resolution as a black and white system."

Dr. Goldmark's own observations on the record in this hearing attest to the importance of resolution or picture detail in a color system as well as in a black and white system. During the November, 1949 comparative demonstration before the Commission, Dr. Goldmark, at a viewing distance of more than 20 times picture height from the RCA color receiver was able to read finer print than he was able to read on the CBS color receiver from a distance of approximately 12 times picture height (Tr. 5945-46). Dr. Goldmark's experience in this regard was at that time confirmed by the experience of Dr. DuMont (Tr. 5946).

The effect of the decrease in picture detail on the black and white picture produced by CBS color transmissions was succinctly stated by Dr. DuMont:

> " . . . I just cannot see how you could possibly consider the Columbia system for the poor black and white picture that you get, and the relatively inferior picture that you get with the Columbia system." (Tr. 9413-14)

A sacrifice of more than half the picture detail in the present black and white picture is part of the "price" which

would be paid by the public for this incompatible CBS color system. A comparable degradation, by administrative fiat, of 60% in an important performance characteristic—either in the quality of voice transmission over telephones or in the performance of one's automobile—gives some basis for comparison of the tremendous sacrifice the public would be called upon to make by this order.

All this is even more sharply brought to consciousness by the further fact that in order to get even this inferior and degraded black and white picture from the CBS color transmissions, it would be necessary for each and every owner of a set to pay at least $50 for an adapter (R. 147-48, 602, 876).

2. The RCA Color Television System.

The "basic findings" of the Commission with respect to the RCA system, as set forth in the opinion of the District Court, are discussed below.*

a. RCA Color Fidelity.

The first "basic finding" is (R. 868):

> "that the color fidelity of the RCA picture is not satisfactory and that there appears to be no reasonable prospect that the defects can be overcome."

In this finding, as in other of the basic findings with respect to the RCA system, there is an intermingling of past and future. The RCA system was not rejected as to color fidelity because it was not satisfactory. It was rejected because it was allegedly not satisfactory "*and* . . .

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* These "basic findings", like those relating to the CBS system, appear in the Opinion of the District Court (R. 868-69). They were apparently taken by the court below from the CBS Memorandum filed in that court and are not exact quotations from the Commission's Reports and order. They are, however, a fair composite of what the Commission said in its First and Second Reports.

there appears to be no reasonable prospect that the defects can be overcome." Thus, the finding is unsupported if it falls on either ground—past or future.

Great progress was made by RCA between its early demonstrations in the fall of 1949 and the close of the testimony before the Commission in May, 1950 (R. 871-72, 881).

This was attested to even by CBS' witnesses. Thus, Dr. D. B. Judd of the National Bureau of Standards was called by CBS as its expert on color fidelity. Dr. Judd had not been impressed with the color fidelity on the RCA laboratory sets he saw in the early stages of the hearing. But when he returned to the stand in April, 1950 he said in respect of color fidelity that "One of the best demonstrations by the RCA system" occurred on a receiver which was brought to the Bureau of Standards in connection with tests of color television systems (Tr. 9314). He added:

> "The show that I saw then . ... was the equal of any of the CBS shows on color fidelity". (Tr. 9314)

The comments of various members of the Commission are also informative with respect to the color fidelity of the RCA system.

The Acting Chairman of the Commission stated to an RCA witness, on the record on April 11, 1950, that:

> ". . . your picture is greatly improved since your first showing". (Tr. 8516)

Another Commissioner commented on March 16, 1950:

> ". . . we have seen that [the RCA system], and it produced beautiful color". (Tr. 6900)

The same Commissioner also stated on February 27, 1950:

> "I noticed the marked improvement in your color the other morning at Laurel, and I think we all did,

> and I was completely surprised by the lifelike reproduction, particularly in the final RCA picture, where the man inserted flowers in that shallow dish." (Tr. 6130-31)

The fundamental fact regarding color fidelity of the RCA and other systems presented to the Commission was stated by the Condon Committee:

> "There is . . . no basic difference in the color fidelity of the three color systems." (R. 362)

The Commission was advised of this fact the very first day of the hearings in September, 1949. Mr. Donald Fink, a leading electronics engineer and a member of the Condon Committee, testified (Tr. 2014):

> "All systems considered are believed to have the same capabilities in this respect [color fidelity]."

Mr. Donald K. Lippincott, an independent expert testifying on behalf of CTI, stated (Tr. 4594):

> "... there is every reason to believe that the color fidelity would be the same in all of the systems."

To the extent that the record indicates that there may be a difference between the color systems in respect of the ultimate color fidelity attainable, the difference is in favor of RCA. Thus, Dr. Goldsmith, of DuMont Laboratories, testified:

> "Theoretically the RCA type system . . . can probably give the highest color fidelity of any of the systems." (Tr. 9926)

Furthermore, the Condon Committee reported that tests conducted by the Bureau of Standards showed that

> "In February 1950 the RCA system of television in color was found to yield substantially as faithful

> reproductions in color as is common by Kodachrome photographs." (R. 396)

In the face of this evidence, the Commission has gone so far as to refer to the RCA system in oral argument in the court below as

> "... a system which will give some kind of splotches of color in a laboratory ..." (Tr. of Proc. 240).

The fallaciousness of the so-called "basic finding" with respect to the color fidelity of the RCA system is further proved by the coupled assertion that

> "there appears to be no reasonable prospect that the defects can be overcome".

This finding reflects testimony by CBS. However, CBS witnesses themselves later admitted on cross-examination that they were wrong.

For example, on October 11, 1949, Dr. Goldmark of CBS, testified in response to a question by Commissioner Hennock (Tr. 3585):

> "Commissioner Hennock: Do you mean to say that nothing can improve the R. C. A. system?
> "The Witness: No, nothing, I think."

On the same day, Dr. Goldmark also testified that the RCA system was not even worth field testing (Tr. 3585), and that "there is grave doubt that it will ever emerge from the laboratory" (Tr. 3566).

In contrast, on April 18, 1950 Dr. Goldmark admitted on cross-examination that the RCA color picture had improved a "thousand percent" (Tr. 8882-83).

The fact of "substantial improvement" in the RCA color picture was also admitted on April 17, 1950 by the President of CBS on cross-examination (Tr. 8609-12).

It is of interest to compare the "grave doubt" that the RCA color television system would "ever emerge from the laboratory" with what actually happened.

Beginning January 9, 1950, RCA color transmissions went on the air over Station WNBW in Washington, D. C. and continued regularly for more than nine months. (Tr. 6051, 6107-8, 7227; Exhibits 427, 429, 430). These broadcasts were substantially identical with normal commercial operations (Tr. 7227).

In this connection, an interesting variation of the CBS testimony that "nothing can improve the RCA . . . system" is that it would take a long time before the RCA system would be ready. Thus, on February 28, 1950, Adrian Murphy, of CBS, was being questioned by Commissioner Hennock with respect to cost estimates for RCA receiving sets. This exchange then occurred (Tr. 6211):

> "Commissioner Hennock: Don't you think they [RCA] are waiting for that direct tube? . . .
>
> "The Witness: I think they may have a *long wait* . . ."

Twenty-four days later RCA demonstrated the RCA tricolor tube to the Commission and staff (Tr. 7475).

The position of the Commission and CBS, as set forth in their Motion to Affirm (p. 18), that the RCA system is "inherently deficient and incapable of producing satisfactory color pictures" cannot find support on the basis of the whole record.

Outmoded and superseded testimony is not substantial evidence.

Furthermore, in its Progress Report of July 31, 1950, RCA invited the Commission to see for itself the improvements which had been made. These matters the Commission refused to consider.

On October 4, 1950 RCA formally petitioned the Commission to review "the improvements made in the performance of the RCA system, with particular reference to those points about which the Commission expressed doubts" (R. 408-09). This petition was denied (R. 410-12).

It is submitted that when the record as a whole is reviewed, there is no substantial support for the finding of the Commission with respect to the color fidelity of the RCA system.

b. RCA Picture Texture.

The second "basic finding" is (R. 868-69):

> "that the texture of the RCA color picture is not satisfactory and that it is difficult to see how this defect can be eliminated."

Again it is important to note the interdependence of past and future. The RCA system was not rejected because its picture texture was not satisfactory. It was rejected because it was allegedly not satisfactory "*and* . . . it is difficult to see how this defect can be eliminated".

The statement is disproved by the quotations from the record set forth above with respect to color fidelity.

In addition, on the specific point of picture texture, one Commissioner also said that

> "There was something very lifelike about your exhibit, that floral exhibit, and I could almost—I got a feeling of *texture* of flowers . . ." (Tr. 6139)

As Dr. Brown of RCA testified, with appropriate apparatus for the RCA system

> ". . . you see no semblance of the dot structure . . ." (Tr. 7745)

Dr. Brown further testified with respect to

> ". . . this little circuit, no tubes, simply four coils, four condensers, . . ."

the use of which results in

> ". . . taking the dots out of the picture." (Tr. 10751-52; Exhibits 209, Fig. 7; 305)

With respect to the future of RCA picture texture, even Chapin the Commission engineer testified:

> "I suspect that there are methods in which the dots may be very much reduced so far as seeing the dots in the picture is concerned. . . . But I think, so far as the dots merely that the viewer sees in the picture, you can make a substantial reduction in that dot structure and maybe get it so that you won't notice it." (Tr. 10656)

The Commission, by the RCA Progress Report of July 31, 1950, was advised that any deficiencies in this respect had been overcome. In that Report it was stated (R. 400):

> "The elimination of dot structure and moire pattern is due to the use of improved circuits in the receivers which make better use of by-passed 'mixed highs'."

As in the case of color fidelity, we submit that no such "basic finding" can find support in this record.

c. RCA Receiving Equipment

The third "basic finding" is (R. 869):

> "that the receiving equipment utilized by the RCA system is exceedingly complex and that there is no assurance, even if the tri-color tube is successfully developed, that the RCA receivers will not continue to be unduly complex and difficult to operate".

Here is the same interdependence of past and future, neither aspect of which is supported by the record.

The testimony of Mr. Donald Fink, an independent expert and a member of the Condon Committee, with respect

to the relationship of alleged apparatus simplicity to transmission standards is of interest. He stated:

> "The attitude of the public five and ten years from now with respect to what they then have in a color television system . . . is a very important matter, and rather than choose the wrong system, *because of some real or fancied simplicity that is advanced,* I would like to see the system which will be welcomed by the whole mass of the American people when we have twenty or thirty or forty million television receivers ten years from now, the system they really want, not something that we made a mistake picking in 1950." (Tr. 7974-75)

Mr. Fink had commented in 1949 on the complexity of the RCA equipment. In April, 1950, after the RCA tri-color tube had been shown, he testified on the record that the complexity to which he had referred had been eliminated with the introduction of receivers using that tube (Tr. 7966-67). He further testified that, with the RCA tri-color tube, the RCA system has, from the standpoint of simplicity, a bit of an edge over CBS disc apparatus since it does not involve movable parts; and that, in any event it is now

> " . . a stand-off so far as complexity goes as far as the two are concerned". (Tr. 7967)

Even Chapin, the Commission's staff engineer with an interest in the adoption of the CBS system, admitted (on cross-examination) that on the question of complexity there is not "much significant difference" between RCA and CBS (Tr. 10632).

Dr. Goldmark of CBS admitted with respect to the RCA system on cross-examination (Tr. 8881):

"There was improvement in simplicity of equipment, that is correct."

The issue of receiver complexity is, in a very realistic sense, reflected in receiver costs. If a receiver is complex, that complexity is bound to be reflected in a higher price. On this basis, the testimony of Dr. DuMont, and that of Mr. D. B. Smith, a Vice President of Philco Corporation, is pertinent. After the RCA tri-color tube (which greatly simplified RCA color receivers) was demonstrated, Dr. DuMont testified that the cost of making a set for RCA

"... would probably be less than the making of the Columbia [disc] set ..." (Tr. 9392)

He stated:

"I think it [CBS equipment] is probably a little more complex than ... RCA." (Tr. 9391)

Mr. Smith testified that

"... I have a very strong conviction that the cheapest way ... to build a color receiver is to use a direct-view type of color tube and a dot sequential [i.e., RCA] ... standard". (Tr. 9201)

Dr. Baker, the head of the Electronics Division of the General Electric Company, testified in respect of the RCA tri-color tube, which is the heart of the RCA receiver, that

"... It is certainly a beautiful development ..." (Tr. 9711)

Dr. DuMont characterized the tube as one of the significant developments in the television field (Tr. 9456).

Dr. DuMont also testified that

"... I mentioned the dot sequential [RCA system] because I think, on the basis of what has been shown,

and the potentialities, that that probably is the best bet . . ." (Tr. 9495)

Mr. Fink testified:

"I would have said on a stack of Bibles that the tri-color tube was impossible". (Tr. 7994)

Dr. Baker of General Electric further testified that

"As to the RCA system itself, I think it is an elegant piece of work". (Tr. 9619)

Hazeltine Research Corporation outlined the extensive research it has conducted in television, including its work in color. It said that it was the considered opinion of Hazeltine engineers that

"The fundamentals of the RCA system present at this time the most attractive approach to a solution of the problem". (Exhibit 384)

Even Dr. Goldmark of CBS admitted, on cross-examination, that the RCA tri-color tube

". . . was an admirable accomplishment . . ." (Tr. 11282)

These statements are not stale testimony. They do not relate to the early part of the hearing which was superseded by new developments, including the RCA tri-color tube.*

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* With reference to the improved apparatus shown by RCA during the course of the hearings before the Commission, it is of interest to note the about-face made by CBS's principal technical witness, Dr. Goldmark. On October 17, 1949, before RCA had developed its simplified tri-color tube receivers, he testified (Tr. 3998):

". . . differentiation between system and apparatus is absolutely unpractical and unrealistic . . ."

On May 10, 1950, after RCA had developed its tri-color tube receivers, Dr. Goldmark stated as a "criticism of RCA" (Tr. 11274):

". . . they do not differentiate between system and apparatus . . ."

In a case of this character, concerned as it is with a highly technical and rapidly developing art, it is the latest facts which are important. For the Commission to cite, as supporting a finding, evidence that is obsolete, is the equivalent of making a finding which is not supported by substantial evidence in any realistic or legal sense.

d. RCA Transmitting Equipment.

The forth "basic finding" is (R. 869):

> "that the equipment which RCA utilizes at the transmitting station is exceedingly complex and there is no assurance that satisfactory commercial type station equipment can be built".

This too covers both past and the future.

The facts are that, as shown by the record, the RCA system has been operated for more than 800 hours by regular NBC studio personnel whose background and training was ordinary black and white television operation (Tr. 6051, 6102, 6107-08, 7227; Exhibit 427). There is simply no evidence in the record to show that RCA color transmitting equipment raised any problems of complexity in actual operation.

Dr. Goldsmith of DuMont Laboratories testified that in actual operation the RCA people had ". . . done a wonderful job . . ." with their color camera (Tr. 9954).

RCA's position with respect to its color studio apparatus was stated by the Chairman of its Board, Brigadier General David Sarnoff, when he testified before the Commission on May 4, 1950 that RCA was

> ". . . ready to take orders for that type of apparatus." (Tr. 10445)

As for the finding of "no assurance" for the future, among the other RCA improvements the Commission was

asked to but refused to see were improvements relating to transmitting apparatus (R. 402-03, 408-09).

The facts are that the costs of studio equipment are relatively minor in the economics of broadcasting. The President of CBS himself recognized this when he testified before the Commission. He stated that even if the broadcaster's equipment costs were high under the RCA system

> ". . . I do think the basic problem is one of circulation [i.e., number of receivers], and it would be easier for the broadcaster to cope with that problem [the economic impact of color television] under the compatible system". (Tr. 8781)

And Dr. Goldmark of CBS testified:

> "We agree, CBS agrees, that other things being equal, reasonably increased station operation costs are not decisive in this operation". (Tr. 11232)

e. RCA Alleged Susceptibility to Interference.

The fifth "basic finding" is (R. 869):

> "that the RCA system is much more susceptible to certain kinds of interference than standard black-and-white or the CBS color system".

The kind of interference referred to is that *to* television receivers by other electronic devices. It is not the kind of interference which the Commission was created to regulate—that is, interference by broadcasters with each other. Indeed, the Commission has expressly found that broadcasts of the RCA color system create no more electrical interference than the broadcasts of any other television system (R. 145).

It was the undisputed testimony that the problem of interference of the kind principally discussed in this connection is not peculiar to color television (Tr. 6264, 10692, 10715). It can be and is being eliminated as a matter of receiver design (Tr. 10715-16).

There is no evidence in the record that this alleged susceptibility has ever served as other than a theoretical objection to the RCA system. The Chief Radio Engineer of CBS confirmed this during the hearing when he testified that such interference was of "secondary importance" (Tr. 9175).

f. RCA Network Transmission.

The sixth "basic finding" is (R. 869):

> "that there is not adequate assurance of RCA's ability to network color of proper quality over existing facilities".

This is one of the most clearly erroneous of the "basic findings" and again illustrates the Commission's improper reliance on superseded evidence.

The facts are that on April 6, 1950, Dr. Engstrom of RCA testified that the RCA color system had in fact been networked over the 2.7 megacycle coaxial cable in color (Tr. 8142, 8162). On the day of the official demonstration to the Commission, the coaxial cables in Washington were in use. As the record shows, on that morning the testimony of Owen Lattimore before a Congressional Committee was being carried both by the NBC and the CBS television networks and there was no coaxial cable available for the demonstration (Tr. 8141, 8162). As a result, the narrow frequency channel characteristics of the coaxial cable were simulated by simple means well known to electronics engineers (Tr. 8141-42).

Dr. Engstrom was never contradicted nor cross-examined as to his statement that the RCA color system had successfully been networked over 2.7 megacycle coaxial cable in color.

Although testimony was taken for almost two months thereafter, no question was raised by the Commission or by anyone else as to the ability of RCA to network its system in color satisfactorily over 2.7 megacycle coaxial cables.

It is true that earlier volumes of the transcript contain evidence, and evidence by RCA witnesses, as to the difficulties which might be expected in attempting to transmit this high-definition color television system over the 2.7 megacycle cable. But the significant fact, disregarded by the Commission, is that late in the hearings this was accomplished.

Furthermore, the record establishes that there was no criticism of the quality of the RCA color transmission over the coaxial cable. Indeed, on April 11, 1950, five days after the demonstration, Commissioner Jones made the following observation on the record to Dr. Brown of RCA:

> "Commissioner Jones: Well, now, so far as the reaction of the group was concerned, the group that was there, parties and their counsel and engineers and so forth, connected with this hearing, nobody expressed any dissatisfaction with the 2.4 picture, the one that was confined. I don't mean at the receiver or transmitter now, the conditions of the coaxial cable.
>
> "The Witness: No, they did not express any opinions at all for the record from the crowd there that day.
>
> "Commissioner Jones: It would appear likely, however, that if the picture was so degraded that there was not any pleasure or pleasing value in it or enjoyment value in it, that they would have complained . . ." (Tr. 8533-34)

Furthermore, the record shows that the RCA picture when transmitted over the 2.7 megacycle cable would be far superior to the CBS picture when transmitted under similar conditions. In these circumstances the CBS system would be limited to 117 line horizontal resolution whereas the RCA system has 180 to 200 line horizontal resolution. (Tr. 5719, 8536)

g. RCA Field Testing.

The seventh "basic finding" is (R. 869):

> "that the RCA system has not been sufficiently field tested".

The facts are that the record is replete with testimony and exhibits with respect to the extensive field tests made of the RCA system. The record shows that the RCA color system has been sufficiently and successfully tested (Tr. 6107-09; Exhibits 303, 311, 312, 368, 369, 441, 444, 449). Among other evidence in the record on this point is the fact that RCA color transmissions were on the air with regularly scheduled programs from January, 1950 down to the date of the Commission's order (Tr. 6051, 6107-08, 7227; Exhibits 427, 429, 439).

These transmissions were broadcast at a time when there was substantial audience response to them, by virtue of the compatible nature of the RCA system. Thousands of persons tuned in on these broadcasts and their comments and responses are set forth in Exhibits 364-367 of the record.

The comments of the public set forth in those exhibits constitute the best refutation to this finding.

C. The Record As a Whole Does Not Support the Criteria Chosen by the Commission.

The adoption of the CBS system was premised upon certain criteria which the Commission formulated for the first time after the hearings had ended (R. 155-56). It is apparent from the omissions from these criteria that the ones selected were tailored to fit the CBS system and to make possible the adoption of that system.

There is no support in the record for the omission of other and more important criteria which would have precluded the adoption of the CBS system. Indeed, the evidence establishes the paramount importance of these omitted criteria.

1. Compatibility.

Thus, the Commission failed to include in its post-hearing criteria the all-important quality of compatibility. The Commission thereby directly contradicted the conditions or criteria which it had set in its notice of July 11, 1949 instituting the proceedings. It was there expressly directed that changes in transmission standards "looking toward color television or other television systems" would be considered "only upon a showing in these proceedings that" (R. 25-26):

> "1. Such system can operate in a 6-megacycle channel; and
>
> "2. Existing television receivers designed to receive television programs transmitted in accordance with present transmission standards will be able to receive television programs transmitted in accordance with the proposed new standards simply by making relatively minor modifications in such existing receivers."

Referring to language similar to that of the above notice, Commissioner Webster in testifying before the Senate Interstate and Foreign Commerce Committee in July, 1949 stated:

> "This was very clear and I spent a good deal of time wording it, and I insisted on some of the wording, and so did Mr. Sterling, and compatibility was our objective".*

Commissioner Webster also stated the same day:

> "Now I want to make this clear: If they set up a color television transmitter, what we insist, or what our proposal is, is that you on your present receiver today be able to receive that black and white picture or that color without any change, you see. The present receiver can receive black and white. We want it so that that color transmitter, when it transmits, you can receive on your present receiver without any change at all; you can receive black and white. *That can be done.*"**

Furthermore, the importance of compatibility to the public and to the development of color television was conceded by all parties at the hearings—even by CBS. As Frank Stanton, President of CBS, stated on the stand on March 22, 1950, CBS would "love to have compatibility" (Tr. 7177). However, with the standards adopted by the Commission compatibility is impossible.

Joseph H. McConnell, the President of NBC, testified on March 22, 1950 that (Tr. 7229-30):

> ". . . Of course, all black and white sets served by any transmitter, no matter how interconnected, can

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* *Hearings before the Senate Committee on Interstate and Foreign Commerce*, 81st Cong., 1st Sess. (1949), on the nomination of E. M. Webster to the Federal Communications Commission, p. 21.

** *Id.* at p. 20.

receive these [RCA] color transmissions as black and white programs. This is the importance of a compatible system.

"In fact, should the Commission authorize only a non-compatible color system, we would not be able to embark on any comparable color program.

"During the time the broadcaster put on non-compatible color programs he would lose his entire circulation, except to those persons who had bought adapters, converters or new color receivers. The effect of this on the broadcaster's revenue is obvious. With a non-compatible system, he could not afford choice time for color programs unless he were willing either to sacrifice his large black and white audience or this Commission would authorize him to use two frequencies, one for color and the other for black and white. I do not believe that most station owners could afford the former or that it is realistic to consider the latter. I feel that, as a result, most color programs, under a non-compatible system, would be broadcast in fringe time.

"In addition, the selection of color programs under a non-compatible system would be considerably limited. The small audience would necessarily discourage the broadcaster—as well as the sponsor—from broadcasting his choice programs in color. This lack of select programs in choice time would discourage the public from converting their present black and white receivers for color and from buying new color receivers.

"Telecasters have suffered considerable losses because of the relatively small number of receivers in the hands of the public during the early years. Although this situation has begun to correct itself in black and white television because of the tremendous public acceptance of the new medium, the adoption of a non-compatible color system would extend the period of station losses. It has taken four years of

these losses to build up the black and white television audience to the size it is today. It would take a long time to build up as great an audience for a non-compatible color system."

Testifying further with respect to the importance of compatibility to the development of color television as a broadcasting service, the President of NBC stated (Tr. 7230-31):

> "In my opinion, the adoption by the Commission of a non-compatible color system would be a major factor in delaying the coming of a sound color service on a national basis. I am strongly in favor of such a service. But I do not believe it will be possible for any broadcasters to furnish such a service for a long time if a non-compatible system should be adopted by the Commission.
>
> "With more than five million black and white receivers in the hands of the public, and I think that is the correct figure now, the transition period to the time when an equivalent number of receivers capable of receiving color broadcasts are in the hands of the public would in my opinion be a long one.
>
> "On the other hand, with the RCA system, color broadcasts of outstanding programs in choice viewing time can become an immediate reality without any loss of present service to the broadcaster or to the public. I believe that if the Commission should standardize on this system, it would provide the greatest force to stimulate the growth of color television."

As noted above, the President of CBS also stressed the importance of compatibility. When questioned on October 4, 1949 as to why CBS would not broadcast its color programs in choice time, he stated (Tr. 2983):

> "For the obvious point . . . that at the outset we wouldn't be dealing with the same circulation. Let's face it."*

Adrian Murphy, a CBS vice-president, said CBS would "welcome compatibility" (Tr. 6254).

And every other witness who discussed compatibility, including Dr. DeForest (Tr. 5903), Dr. Geer (Tr. 3896), Fink (Tr. 8015-16, 8027), Dr. Baker (Tr. 9696, 9866), Smith (Tr. 4849-50, 4857-60), Dr. DuMont (Tr. 9374, 9400), Dr. Goldsmith (Tr. 5461-62, 10002-03) and General Sarnoff (Tr. 10057, 10102, 10529-30), testified to its paramount importance.

As stated by Judge La Buy in his dissenting opinion in the court below (R. 879):

> "It is conceded by all and it is self-evident that the best system of color television is a compatible one; that is, a system requiring no change whatever in existing receivers for the reception of black and white as well as color pictures. Indeed, compatibility is the coveted goal of all engineers and scientists engaged in the television industry."

The standards proposed by CBS have been adopted although it has been impossible to make the CBS system compatible. On the other hand, compatibility has been achieved. The Commission found, and the appellees concede, that the RCA color system is compatible (Motion to Affirm, p. 7).

An incompatible system is, therefore, nothing more or less than an unready system. Incompatibility is a basic defect in a color system. It is a problem for the research

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* At that time there were less than 3,000,000 television receivers in the hands of the public as compared with approximately 12,000,000 today.

laboratory. The cost of achieving compatibility should be borne by the developer of a color system. It should not be passed on to the public—as the Commission has done in this case.

2. Resolution (Picture Detail).

The Commission's criteria omit therefrom, contrary to the almost unanimous views of the experts who testified before the Commission, any requirement that the resolution afforded by a color system be of high quality (R. 155-56).*

The importance of resolution, the technical term for picture detail, is indicated by the fact that the first four of the performance characteristics which the Condon Committee stated were "of paramount importance in comparing color television systems" were Resolution, the Flicker-Brightness Relationship, Continuity of Motion, and Effectiveness of Channel Utilization (R. 353). As will be shown, the Commission's Reports either ignored or sought to minimize the advantages of the RCA system over the CBS system in respect of three of these four essential performance characteristics.**

As the Condon Committee stated with respect to resolution (R. 344):

> "The technical term for pictorial detail is 'resolution,' because this . . . represents the ability of the television image to resolve the fine details of the scenes it depicts. As we have seen, resolution is measured by the total number of equivalent halftone dots in the image."

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* The Commission restricted itself to "adequate apparent definition" (R. 155).

** The difference between the RCA and CBS systems with respect to Continuity of Motion, the third performance characteristic considered by the Condon Committee, is relatively slight.

In the past, the Commission recognized the importance of picture detail. In its May 28, 1940 Report, for example, the Commission stated:

> "Two of the important television problems outstanding are to develop (a) a better picture with more detail and greater clarity and (b) a larger picture." (p. 9)

Referring to the adoption by the Commission in May, 1941 of commercial standards for black and white television, the Condon Committee stated (R. 342):

> "Faced by this conflict between quality (pictorial detail) on the one hand, and quantity (number of stations and choice of programs) on the other, the Federal Communications Commission in 1941 adopted for public television broadcasting a black-and-white system having about the equivalent of 200,000 half-tone dots in the picture area. This choice appears to have merit . . ."

The Committee further stated (R. 343):

> "Experience with the 525-line black-and-white system since 1941 has shown that it provides an adequate basis for a public television service, so far as pictorial detail is concerned. But this is not to imply that additional detail would not be desirable if it were available without excessively reducing the quantity of service."

Some time prior to the commencement of the color television proceedings, the Chairman of the Commission, in a speech before the National Association of Broadcasters on April 11, 1949, acknowledged the detrimental effect of a lowering of standards:

> "A concerted lowering of standards would be calamitous to the whole field of broadcasting, could

lead to . . . television [becoming] the national eyesore.'"*

The importance of setting high standards with respect to resolution was emphasized during the hearings before the Commission. Thus, David B. Smith of Philco stated:

". . . the [CBS] standards don't provide a high enough quality service." (Tr. 4949)

Dr. DuMont testified:

". . . the CBS proposals . . . will not permit a picture with sufficient geometric resolution, of sufficient size or with sufficient brilliance without flicker." (Tr. 5555)

He stated further:

"I think you need just as much definition as you can possibly get. You cannot get too much of it." (Tr. 9502)

Donald K. Lippincott, testifying on behalf of CTI, stated:

"My objection to standards for the CBS system at the present time is that it would result in adopting as standards and freezing on the industry a picture which admittedly has 45 [*sic*] percent less definition." (Tr. 6503)

Dr. T. T. Goldsmith's requirement for a satisfactory color television system was that it should solve the problem of

"getting high definition color into a 6 megacycle channel." (Tr. 5499)

* FCC Release No. 35013.

He also testified:

> "The lack of definition is serious and is a basic limitation of the [CBS] system." (Tr. 5134)

Even Dr. Stanton of CBS spoke of a "reduction in performance" and the "loss of geometrical resolution" in the CBS system (Tr. 2991-93).

The importance of resolution or definition in television programming was formerly frankly recognized by CBS. Thus in an application to the Commission in 1944, CBS recognized that poor resolution would "curtail flexibility and the techniques of pick-up in order to achieve simple recognizability of objects and persons" (Tr. 9346).

Adrian Murphy of CBS admitted that degraded resolution limits flexibility in this respect (Tr. 9347).

Indeed, CBS formerly took the position that even the present 525 line standards did not provide sufficient definition.

Thus Dr. Goldmark of CBS testifying in 1944 before the Commission stated:

> "We feel certain that to ensure continued public acceptance . . . the definition of prewar pictures . . . must be increased. . . . we propose . . . black-and-white at 735 lines per picture . . . color with 525 lines".*

Paul Kesten, then Executive Vice President of CBS, stated in 1944:

> ". . . [the 525 line standards] are simply not good enough to put television over as a real public service or even as a going enterprise." (Tr. 8621)

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* FCC Docket No. 6651, p. 1874. The record in Docket No. 6651 was incorporated by reference in the proceedings here under review at the request of Commission counsel (Tr. 8873).

Similarly, Worthington Miner, then Manager of the CBS Television Department, stated that to proceed with the present 525 line television system instead of a system with a greater number of lines would be "inviting disaster" (Tr. 8635).

Moreover, in 1944 CBS took the position that there is a definite relationship between limited resolution and limited picture size:

> "The limiting factor for any larger image is, inexorably, the number of tiny picture elements which it contains—the fewer they are, the more quickly will they 'fly apart' with enlargement." (Docket 6651, Exhibit 272, p. 7)

Regarding this same problem, Mr. McIntosh, testifying for CTI in 1949 regarding the standards then proposed by CBS and now adopted by the Commission, stated:

> ". . . limited resolution, even with the standard television field rates, sets an upper limit to the size of screen which can profitably be used. The CBS proposal involves a further and an inescapable limitation on effective screen size, even apart from the problem of that system's rapidly spinning wheel." (Tr. 4746)

By adopting the CBS system, the Commission now disregards the importance of resolution. The CBS pictures based on the transmission standards fixed by the Commission's order will have only approximately 80,000 picture elements—considerably less than half the picture elements provided by the present black and white television service and the RCA color system (R. 360, 575-76, 584, 795).

3. Picture Size.

The Commission omitted altogether from its criteria any mention of picture size. There is no support in the record, in public preference, or in common sense for this omission.

In 1940 the Commission stressed the importance of developing "a larger picture"*. As a result of continued development work, the size of television pictures has been steadily increased. It was uncontroverted at the hearings that the public is interested in and desires larger and larger pictures.

Contrary to technological development and the public interest, the system proposed by CBS and adopted by the Commission was found by the Commission to be, as a practical matter, limited at the present time to a direct-view receiver picture of a size provided by a 12½ inch picture tube (R. 164, 418).

The seriousness of this limitation is shown by the fact that over 99 per cent of the television receivers in the hands of the public are direct-view receivers, and it is estimated that approximately 90 per cent of all receivers sold today are receivers having picture tubes of 16 inches or larger (R. 602).

The Commission in its Second Report endeavors to minimize the importance of this limitation (R. 418).

Commissioner Sterling strongly dissented from the majority of the Commission in this respect. He stated, and the record will not support a contrary conclusion (R. 429):

> ". . . I do not agree with this belief. I believe that the rapid acceptance by the public of receivers incorporating larger sized black and white tubes as

* FCC, REPORT, Docket No. 5806, p. 9 (May 28, 1940).

they moved from 7″ to 10″ to 12″, then to 16″ and 19″ clearly indicates the preference of the public for large size TV pictures and they will not be satisfied with smaller pictures because they are in color.''

4. Flicker-Brightness.

The Commission's criteria fail to give proper recognition to the importance of the flicker-brightness relationship. This is a fundamental and determinative system characteristic and has been so considered by the Commission in the past. FCC, REPORT, March 18, 1947, 11 F. C. C. 1523, 1531.

As has been pointed out above in the discussion of the Commission's basic findings with respect to the CBS system, there are basic limitations as to the picture brightness without flicker which may be secured with that system. The RCA color television system on the other hand permits nine times the flicker-free brightness of which the CBS system is capable (R. 360-361, 368, 585).

With respect to brightness Mr. Donald Fink had the following recommendation to make in the setting of standards:

> ". . . I feel that the public would like both bright pictures and finely defined pictures . . . and as long as the standards do not prohibit them from getting either, the standards are correctly set.'' (Tr. 7986)

Dr. Engstrom of RCA testified it was his feeling that:

> ". . . I like to see color pictures brighter than the same scene . . . in black and white.'' (Tr. 8155)

The flicker-brightness relationship minimized in the Commission's criteria is a performance characteristic listed by the Condon Committee as one of the factors of fundamental importance in deciding among systems (R. 353).

5. Effectiveness of Channel Utilization.

This all-important characteristic is omitted altogether from the Commission's criteria.

In contrast, the Condon Committee stressed the importance of this characteristic and found that the RCA system is superior to all the other systems with respect to effectiveness of channel utilization. The Condon Committee found that

> "The effectiveness of channel utilization of the RCA color system is the highest of all the systems . . ." (R. 370)

This is of the greatest significance in respect of the basic statutory obligation of the Commission to "encourage the larger and more effective use of radio in the public interest". As stated by this Court in *National Broadcasting Company* v. *United States*, 319 U. S. 190, 216:

> "The facilities of radio are limited and therefore precious; they cannot be left to wasteful use without detriment to the public interest."

The conservation of the radio spectrum and the providing for the most effective use of frequencies is a paramount duty of the Commission.

The more effective channel utilization of the RCA system is an inherent advantage of that system over the CBS system. This is because the RCA system makes use of channel saving techniques which cannot be used by the CBS system (R. 351-52, 362, 368, 372, 586-589). Yet the Commission makes no mention of this advantage.

There is no basis in the record for the Commission to disregard, as it did, the public interest in compatibility, high resolution, unlimited picture size, absence of flicker and effectiveness of channel utilization.

The defects of the CBS system in these five respects—incompatibility—low resolution—small picture size—inferior flicker characteristics—inferior channel utilization—were compelling reasons for the Commission to reject the CBS system. Yet the Commission, by tailoring its criteria, achieved the opposite result.

POINT III.

The Ruling Out of Broadcasting of a Compatible System in Competition With an Incompatible System Is Contrary to Law.

In the preceding points, appellants have taken the position that the adoption by the Commission of an incompatible color television system was contrary to law.

In this case the Commission has departed from the principles of standardization followed for over a decade, including the principle that there shall be a single set of standards for a single service. Having done this, having adopted an incompatible system with all the disrupting effects which the principles of standardization were designed to prevent,* there is no basis in the statute, or in principle or policy, for ruling out the broadcasting of compatible color.

Therefore, this appeal raises the following additional questions:

1. Whether the Commission was authorized to prevent competition in broadcasting where no inter-

* The CBS system uses 405 lines and 48 color fields per second. The RCA system uses 525 lines and 60 fields. The existing television standards have for ten years also used (and will continue to use) 525 lines and 60 fields. Thus we will have, as a result of the order, two "standards"—or "multiple standards"—for television, incompatible with one another.

ference by one broadcaster with the signals of another is involved;* and

2. Whether such action can be sustained where there are no administrative findings to support it.

Both must be answered in the negative.

A. The Limitation on Competition.

The general policy of the Communications Act of 1934, in so far as it relates to broadcasting, is one of competition. The decisions of this Court emphasize the obligation of the Commission to promote competition in broadcasting.

Nevertheless, the action of the Commission rules out the broadcast of compatible color signals—those which can be received in black and white on the nearly 12,000,000 black and white sets now in the hands of the public—and permits only the broadcast of incompatible color signals—those which cannot be received on existing television sets.

The Commission has conceded that the effect of the order is to provide that if a broadcaster chooses to broadcast color television, the signals transmitted "*must con-*

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* The Commission is not justified in saying that, unless standards are first set by the Commission, each broadcaster could transmit whatever type of signal he chose

> "regardless of its interfering effect on other broadcasters . . ." (Motion to Affirm, p. 3).

The fundamental purpose of the Communications Act of 1934 (in so far as it relates to broadcasting) and of its predecessor, the Radio Act of 1927, was to confer upon the Commission authority to prevent just such interference by one broadcaster with the signals of another. The Commission clearly has such authority—before or after the adoption of commercial standards.

This case does not present that problem at all. It presents, in fact, just the converse. It involves for the first time the question whether the Commission has the authority to rule out transmissions which do *not* create any interference with the signals of other broadcasters, which *can* be received on all existing sets, and which do not hurt anyone.

form" to the standards adopted by the Commission (Motion to Affirm, p. 3). These standards have been written for the incompatible CBS system only.

As is thus apparent, the order rules out the broadcasting of television signals in accordance with the RCA compatible system, although the Commission has found that these signals can be received on the 12,000,000 black and white receivers in the hands of the public as black and white pictures, without the owners so much as touching their receivers (R. 149; Motion to Affirm, p. 7).

The Commission has also found that the broadcasting of RCA color would not create electrical interference by one broadcaster with another (R. 145).

The Commission's Reports and order clearly contemplate that television signals transmitted pursuant to the CBS system will be reproduced on some receivers as color pictures and on other receivers as black and white pictures. But the order prohibits the addition of technical characteristics to the existing television signals which would make possible the reproduction of those signals in color as well as in black and white.*

As a result, the present system of black and white must face competition with CBS black and white. But CBS color is immunized from competition with compatible color.

This limitation on competition was imposed in spite of the clear and uncontradicted fact, testified to by the CBS Vice President and Chief Engineer, Dr. Goldmark, that the adoption of compatible color television standards would hurt nobody.

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* This is what the RCA system does. It adds technical characteristics to the existing standard television signal, enabling receivers designed to use those extra characteristics to produce color pictures.

Dr. Goldmark, testifying for CBS, the sole proponent of an incompatible system, stated:

> "There is one non-compatible system. . . . There are two compatible systems . . . I couldn't sit here and tell you not to adopt standards of any of those systems because they don't have that device *because nobody would get hurt by it if you do. They are compatible.*" (Tr. 6546)

B. The Question of the Commission's Authority.

For the first time in the administrative practice of the Commission it has adopted the theory of permitting some competition among transmitting systems within the same broadcast band while suppressing other competition among those systems. No judicial determination by this Court nor any other court supports this assertion of authority by the Commission to limit competition.

The Communications Act gives the Commission no power thus to suppress competition. On the contrary, the policy of that Act, in so far as it relates to broadcasting, is to encourage competition.

This case presents for the first time the question of whether the Commission has the legal power thus to suppress competition.

In fixing television standards the Commission has purported to act in the public interest, convenience and necessity. Its action in fixing such standards in the past has been based upon the position that standards should assure to the public a system of broadcasting

> ". . . which will enable every transmitting station to serve every receiver within its range."*

* FCC, REPORT OF THE COMMISSION IN THE MATTER OF ORDER NO. 65 SETTING TELEVISION RULES AND REGULATIONS FOR FURTHER HEARING, Docket No. 5806, p. 2 (May 28, 1940).

Had the Commission done that here—had it approved a compatible system so that every television transmitting station would serve every receiver within its range—its action would have represented the principle of standardization. And that action would have been consistent with the administrative practice in which the industry, over the years, has acquiesced.

But the Commission did not do that. Its order is the very antithesis of standardization. It adopted a system of color television by which every television transmitting station will *not* serve every receiver within its range.

If this Court should hold that the Commission can lawfully depart from its position requiring a single system of television broadcasting which enables every transmitting station to serve every receiver within its range, and that the Commission can adopt a new concept based on competition rather than standardization, in that case the Court should strike down the order in so far as it rules out competition between compatible color and incompatible color.

All we ask, in that case, is the right for compatible color to compete.

C. The Policy of Competition.

The policy of the Communications Act in respect of competition in the broadcasting field was stated by this Court in *Federal Communications Commission* v. *Sanders Brothers Radio Station*, 309 U. S. 470:

> "... the [Communications] Act recognizes that the field of broadcasting is one of free competition. The sections dealing with broadcasting demonstrate that Congress has not ... abandoned the principle of free competition. ...
>
> • • • • • •

> "Congress intended . . . to permit a [broadcasting] licensee who was not interfering electrically with other broadcasters to survive or succumb according to his ability to make his programs attractive to the public." (pp. 474-75)*

The majority of the District Court did not refer to the action of the Commission in restricting competition. Judge La Buy in dissenting, however, stated that:

> "To prohibit the broadcast of color in completely compatible systems, whether it is RCA or any other fully compatible system, is a bar to competition between compatible and incompatible color and is unreasonable and arbitrary." (R. 881)

As recently as 1950 the Commission cited the *Sanders* case in denying a petition for rehearing which sought to reopen the question of the policy of competition under the Act. In this case the Commission said**

> "The public interest strongly favors competition in the broadcast industry. The whole scheme of regulation embodied in the Communications Act of 1934 is based upon the proposition that the governmental policies appropriate to the areas of free competition rather than those applicable in the public utility and common carrier fields will achieve the most satisfactory utilization of our available broadcast spectrum. This was explicitly recognized by the Court in the *Sanders Bros.* case. . . ."

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* In the *Sanders* case this Court held that the Commission, in granting the application of a new broadcast licensee, need not consider whether the competition resulting from the new broadcaster would be detrimental to the financial operation of an existing broadcaster.

** *In re Application of L. E. Duffey and B. C. Eddins, d/b as The Voice of Cullman*, Docket No. 9325, March 27, 1950; PIKE AND FISCHER, 6 R. R. 164, 169.

D. Absence of Required Findings.

The Commission made no findings on the question of refusing to permit broadcasting of the compatible RCA system in competition with the incompatible CBS system.

On the contrary, the Commission has found that the broadcasting of RCA color would not, in the language of the *Sanders* case,* create electrical interference by one broadcaster with another.**

There is no finding by the Commission, contested or otherwise, that the commercial broadcasting of the RCA compatible television system should not also be authorized together with the incompatible system.

During the hearings there was substantial questioning and testimony with respect to the possibility of permitting the broadcasting of both the CBS and RCA color systems.

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* *Federal Communications Commission* v. *Sanders Brothers Radio Station*, 309 U. S. 470, 475. Appellants are not here contending for the "traffic cop theory" of the Commission's powers, *i. e.*, the theory that the Commission's powers are limited to policing the wavelengths to prevent stations from interfering with each other. *National Broadcasting Company* v. *United States*, 319 U. S. 190, 215. Appellants' position here is rather that the authority which the Commission does have to prevent stations from interfering with one another is no basis for the denial of competition between compatible and incompatible color, since the Commission has found that the broadcasting of compatible color does not create interference between one station and another.

** Except in the particular referred to in the next paragraph, the Commission found that the RCA and CBS systems are alike in having "about the same susceptibility to interference as the present system for both normal operation and offset-carrier operation". (See ¶¶100 and 101 of the First Report, R. 145-46). Stated otherwise, the Commission found that the addition of color to the transmitted television signal does not create interference—either in the CBS or the RCA system.

In the case of the RCA system the Commission said there was an exception as to interference. But the exception to which it referred (¶¶101 and 136 of the First Report and 3(e) of the Second Report; R. 145-46, 161 and 414) was alleged interference *to* RCA color receivers caused by other electronic devices. Whether or not

This would permit the two systems to compete for public approval and acceptance. Brigadier General David Sarnoff, Chairman of the Board of RCA, recommended that if the Commission should adopt standards for an incompatible system, it should permit the broadcasting of compatible systems as well (Tr. 10093-95). He urged that the standards set by the Commission be broad enough to permit any color television systems which met the basic requirements of compatibility, definition equal to the present high-quality television standards, and transmission within a 6-megacycle channel (Tr. 10046-47).

There is no finding by the Commission that the broadcasting of compatible color in competition with incompatible color would not be in the public interest.

So far as appears from the Commission's First and Second Reports, the Commission did not even consider whether there was any middle ground between the exclusive adoption of an incompatible system and the exclusive adoption of a compatible system. The Reports do not show that the Commission considered the possibility or advisability of permitting the broadcasting of compatible color together with the broadcasting of incompatible color.

It is apparent, therefore, that reversal of the District Court's judgment is required by the decision of this Court in *Jacob Siegel Co.* v. *Federal Trade Commission*, 327 U. S. 608. In that case, this Court held that it should not consider whether the complete prohibition there imposed by the Federal Trade Commission was warranted, since the

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this may serve as a basis for action by the Commission to deal with the alleged interference caused by those devices, it does not furnish a basis for the rejection of a system whose broadcast transmissions do not interfere with the transmissions of other broadcasters. In fact, alleged interference *to* television receivers can be and is being eliminated as a matter of receiver design (Tr. 10715-16).

Commission had not considered whether alternatives were possible:

> "But in the present case, we do not reach the question whether the Commission would be warranted in holding that no qualifying language would eliminate the deception which it found lurking in the word Alpacuna. For the Commission seems not to have considered whether in that way the ends of the Act could be satisfied and the trade name at the same time saved. We find no indication that the Commission considered the possibility of such an accommodation. It indicated that prohibition of the use of the name was in the public interest since the cease and desist order prohibited the further use of the name. But we are left in the dark whether some change of name short of excision would in the judgment of the Commission be adequate. . . . Its expert opinion is entitled to great weight in the reviewing courts. But the courts are not ready to pass on the question whether the limits of discretion have been exceeded in the choice of the remedy until the administrative determination is first made." (327 U. S. at pp. 613-14)*

The instant case is *a fortiori* under the *Siegel* case. Whether this Commission has the power to suppress scientific development, such as a compatible color television system, is certainly a grave question. If the Commission does have that power, it is one to be exercised with the greatest restraint and only if no other reasonable alternative is available, since it involves the stultification of the priceless national resource of invention and research.**

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* Cf. *Touhy* v. *Ragen and McSwain*, 19 U. S. L. Week 4151 (U. S. Feb. 26, 1951).

** See Vannevar Bush, *Science—The Endless Frontier*, a Report to the President by the Director of the Office of Scientific Research and Development, 5 (1945).

Here the alternative was to permit compatible color to prove its worth in the arena of public choice—an alternative that is not even discussed in the First and Second Reports.

E. Purported Justification of Limitation on Competition.

As indicated, the Commission made no findings that the broadcasting of the RCA compatible system should not also be authorized in competition with the incompatible system.

In their briefs in the District Court and in their Motion to Affirm in this Court, appellees have attempted to substitute arguments of counsel for this lack of findings. These arguments will now be examined, and contrasted with what the Commission said and did.

In its Second Report the Commission stated that the adoption by it of incompatible color standards would promote competition between color receivers and black and white receivers. It said that:

> ". . . if both types of receivers are offered to the public, *it will be the free forces of competition* which govern whether a customer will buy a color receiver or a black and white receiver." (R. 418)

It is clear from this statement that *what the Commission did in issuing its order was to adopt multiple standards.* For it is obvious that its incompatible color standards are different from the existing black and white standards. Yet both operate *in the same broadcast band.*

This is where the alleged analogy of AM/FM sound broadcasting breaks down. Those services operate in *different* broadcast bands. Black and white and color television operate in the *same* broadcast band—actually in the very channels now used by black and white. They are the same service—the television service.

This is the first time in the administrative practice of the Commission that it has adopted the theory of multiple standards operating in the same broadcast band. The Commission recognized that this was what it was doing and claimed that it had the virtue of establishing competition between incompatible color and black and white.

But the effect is to highlight the competition that the Commission ruled out. No sophistical argumentation about "the particular service involved" can obscure the fundamental fact that the Commission has adopted multiple standards; has provided for some competition; and has suppressed other competition—all within the same broadcast band.

It is in the light of this fact that the Commission's purported justification in argument of the suppression of competition between compatible and incompatible color must be viewed.

1. The Alleged Color Performance of Receivers.

Appellee, in argument purport to justify the Commission's action in limiting competition on the ground that "... for the Commission ... to permit the regular commercial broadcasting of an unsatisfactory system, and thus to encourage the public to purchase RCA color receivers which cannot produce satisfactory color pictures would palpably not be in the public interest" (Motion to Affirm, p. 19). Appellees also stated that "To permit the public to buy new color receivers for a system which does not perform adequately would be an unthinkable violation of public interest".* In the same vein the Commission characterized the RCA system in the District Court as producing "splotches of color in a laboratory". (Tr. of Proc. 240)

* Reply Brief of appellees in District Court, p. 6.

These references by appellees in *argument* to the RCA system as producing "splotches of color in a laboratory" and as having receivers "which cannot produce satisfactory color pictures" are to be compared with what the *record* shows.

One of the Commissioners commented on the record on March 16, 1950 that the RCA system "produced beautiful color" (Tr. 6900).

The Acting Chairman of the Commission stated as to the RCA system on the record on April 11, 1950 that ". . . your picture is greatly improved since your first showing" (Tr. 8516).

Dr. D. B. Judd of the National Bureau of Standards, who was called as an expert witness for CBS during the hearing, testified as to one of the demonstrations of the RCA system: "The show that I saw then . . . was the equal of any of the CBS shows on color fidelity" (Tr. 9314).

Dr. W. R. G. Baker, the head of the Electronics Division of the General Electric Company, testified in respect of the RCA tri-color tube (the heart of the RCA system) that "It is certainly a beautiful development . . ." (Tr. 9711).

Mr. Fink testified, "I would have said on a stack of Bibles that the tri-color tube was impossible" (Tr. 7994).

Even Dr. Goldmark, the chief technical witness for CBS, conceded on cross-examination that the RCA tri-color tube ". . . was an admirable accomplishment . . ." (Tr. 11282).

In the face of these and other statements in the record, there is no basis for the argument of counsel that the RCA color receivers "cannot produce satisfactory color pictures"; and still less for the reckless remark that it produces "splotches of color in a laboratory".

2. The Asserted Authority to Control the Sale of Receiving Sets.

One of the principal reasons asserted by the Commission in argument for denying competition between compatible color and incompatible color is the claim that it should not "permit the public to buy new color receivers for a system which does not perform adequately . . ."* In developing this point the Commission engages in a remarkably subtle assertion of authority to control the sale of receiving sets while purporting to admit it has no such power.

In its brief in the District Court, the Commission stated: "The Commission's jurisdiction is over the standards of broadcast transmissions, *not over the equipment built by receiver manufacturers.*" (p. 45).

In view of the fact, admitted by the Commission itself, that it has no jurisdiction over the sale of television receivers, the Commission has not asserted a lawful reason for denying competition between compatible color and incompatible color systems in saying it would be violating the public interest "To permit the public to buy new color receivers for a system which does not perform adequately . . .".*

The test of whether a receiver performs adequately is not different in law from whether an automobile performs adequately or a refrigerator performs adequately. It is simply the test of whether that receiver, on its performance, can get itself accepted in the competition of the market place.

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* Reply Brief of appellees in the District Court, p. 6.

3. The Argument of Confusion.

Appellees also contend that the Commission's limitation on competition is justified on the ground that multiple standards "would be complex and confusing, and would result in the purchase either of unduly complicated and as yet undeveloped receivers, or of receivers which could receive only some of the color broadcasts and not others." (Motion to Affirm, p. 19).

This argument of "confusion" is the classic one always advanced against competition.

It is to be compared with the statement of the Commission already given, welcoming the idea of competition as between color receivers and black and white receivers:

> "In any event, if both types of receivers are offered to the public, *it will be the free forces of competition which govern whether a customer will buy* a color receiver or a black and white receiver." (R. 418)

This Court cannot be asked to believe that competition between incompatible color and black and white should be encouraged but that the addition of a compatible color system to the range of free public choice would be intolerably confusing.

In fact, the position of the Commission is even more tenuous.

Its Reports contemplate that television signals transmitted by the CBS system would be reproduced on some receivers as color pictures and on other receivers as black and white pictures. But the present system of black and white will continue, and must face competition with CBS black and white. Thus as a result of the order, we would have in television

(1) the standard black and white signals,

(2) CBS black and white signals, and

(3) CBS color signals,

all in competition with one another.

This the Commission calls "the free forces of competition" (R. 418).

But, if we add to the competition

(4) RCA color signals,

the Commission calls that "confusing" (Motion to Affirm, p. 19).

F. Arguments of Counsel Cannot Supply a Lack of Findings.

Even assuming that the *arguments* advanced by counsel for appellees to justify the ruling out of competition between compatible color and incompatible color had any merit, the fact is that the Commission made no *findings* that competition between color systems should not be permitted.*

Arguments of counsel are thus sought to be made a substitute for the lack of findings of an administrative agency. As this Court held in rejecting a similar effort in *Securities and Exchange Commission* v. *Chenery Corp.*, 318 U. S. 80:

> "But the difficulty remains that the considerations urged here in support of the Commission's

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* It seems clear that no such findings could have been made in view of the uncontradicted fact, testified to by the CBS Vice President and Chief Engineer, Dr. Goldmark, that the adoption of compatible color television standards would hurt nobody. Dr. Goldmark, testifying for the appellee-intervener—CBS—stated that:

> "There is one non-compatible system. . . . There are two compatible systems . . . I couldn't sit here and tell you not to adopt standards of any of those systems because they don't have that device *because nobody would get hurt by it if you do. They are compatible*" (Tr. 6546).

order were not those upon which its action was based." (p. 92)

The foregoing rule that administrative action is legally valid only if it is based on *findings* has been consistently applied by this Court. *Jacob Siegel Co.* v. *Federal Trade Commission,* 327 U. S. 608; *Ashbacker Radio Corp.* v. *Federal Communications Commission,* 326 U. S. 327, 333; *Colorado-Wyoming Gas Co.* v. *Federal Power Commission,* 324 U. S. 626, 634; *Eastern-Central Ass'n* v. *United States,* 321 U. S. 194, 208-12; *Securities and Exchange Commission* v. *Chenery Corp.,* 318 U. S. 80, 92-94, 332 U. S. 194, 196-97; *United States* v. *Carolina Freight Carriers Corp.,* 315 U. S. 475, 488-89; *Phelps Dodge Corp.* v. *National Labor Relations Board,* 313 U. S. 177, 196-97; *National Labor Relations Board* v. *Fansteel Corp.,* 306 U. S. 240, 261; *Thomas Paper Stock Co.* v. *Porter,* 328 U. S. 50, 53; *Yonkers* v. *United States,* 320 U. S. 685, 691-92; *United States* v. *Chicago, M., St. P. & P. R.R.,* 294 U. S. 499, 510-11; *United States* v. *Baltimore & Ohio R. R.,* 293 U. S. 454, 463-65, *Panama Refining Co.* v. *Ryan,* 293 U. S. 388, 431-33.

G. Faith in Free Public Choice.

If CBS and the Commission were really confident that the adoption of the CBS system was in fact in the public interest, if they were really confident that in the readily foreseeable future the CBS system would not be outmoded by a compatible system *on the merits,* the protection of the Commission against the competition of the RCA color television system would not be required. (Tr. 10565-66).

RCA, on the other hand, has full confidence in its color system.

RCA and NBC are willing to back this confidence with their reputation for manufacturing high quality television

receivers, and with their reputation for broadcasting high quality television programs. (Tr. 7246-47, 10041, 10052-55, 10563).

The confidence of RCA and NBC in the RCA color system is not based upon laboratory work alone, but upon actual experience.

It is based on months of field testing under conditions which the record shows closely approximate normal commercial broadcasting conditions. (Tr. 6107-09, 7227; Exhibits 303, 311, 312, 314, 368, 369, 427, 429, 430, 441, 444, 449).

It is based upon the improvements which have been made in the RCA color system at which the Commission has refused even to look.

It is based on the conviction that the technical characteristics of the RCA system do not, unlike those of the CBS system, place a low ceiling on ultimate performance.

Unlike CBS, RCA is willing to broadcast its color television system in choice broadcasting time. (Tr. 2980, 2983, 7105-06, 7231) Unlike CBS, RCA has a valuable good will as a television set manufacturer which it would be risking in the sale of color receivers for its color television system (Tr. 2964, 10052-55).

RCA and NBC are confident that if the commercial broadcasting of the RCA color television system is granted to the public, the risking of their good will on the RCA system, both as a manufacturer and as a broadcaster, will not be in vain. (Tr. 10047, 10055)

H. Power of the Court.

Appellants urge that, even if this Court does not hold the order invalid in its entirety, the Court should in any event hold the order invalid in so far as it denies the public the right to receive the RCA color television system as well as the CBS system.

The Court's power to hold the order invalid so far as it denies to such a broadcaster the right to operate commercially in RCA color is clear.

As this Court has noted, a suit such as this, brought under Section 402(a) of the Communications Act, is "a plenary suit in equity". *Columbia Broadcasting System, Inc.* v. *United States*, 316 U. S. 407, 415. As an equity court, this Court possesses broad power to mold its decree so as to effectuate its decision.

A three-judge court, headed by Chief Judge Learned Hand, in *United States* v. *Associated Press*, 52 F. Supp. 362 (S. D. N. Y. 1943), *aff'd*, 326 U. S. 1, was confronted with a similar problem. There the court found that the by-laws of the defendant Associated Press relating to membership contravened the antitrust laws. The court held in part:

> "A judgment may therefore be entered enjoining the defendants from continuing to enforce the by-laws regulating the admission of members in their present form, but leaving it open to them to adopt substitutes . . ." (p. 375)

After holding other aspects of the activities of the defendant to be illegal the court continued:

> "In all other respects the complaint will be dismissed. . . . However, it is appropriate and fair to provide that, if AP sees fit to amend its by-laws, governing the admission of members, it may have leave to apply in this action for supplemental relief upon the new state-of facts. Moreover, in view of the disorganization which meanwhile might take place, . . . we will stay those injunctions for a period of 120 days after the judgment has been entered. That should be time enough for the defendants to decide what changes, if any, they care to make as to admission. . . ." (p. 375)

So in the present case this Court, in accordance with the decision in the *Associated Press* case, can effectuate its decision as to the illegality of that part of the Commission's order which denies compatible color to the public by declaring the entire order illegal but leaving it open to the Commission to remove the illegality by appropriate amendment of its order eliminating the exclusivity now granted the CBS system.*

Thus, there is no basis in law or fact for denying to the public the broadcasting of a compatible system of color television in competition with an incompatible system.

POINT IV.

The Commission Violated its Duty Under the Communications Act and the Administrative Procedure Act to Inform Itself and to take Account of Determinative Facts.

A. Obligation Under the Communications Act.

Under the Communications Act, the Commission is required in a rule-making proceeding to consider all pertinent information available prior to the issuance of rules. This obligation exists so that the Commission will have a sound and informed basis on which to formulate policies in the best interests of the public generally. The Commission failed in this case to discharge that obligation.

The statutory duty of the Commission to inform itself as to the art, the regulation of which is entrusted to it, is

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* See also, *Addison* v. *Holly Hill Fruit Products, Inc.*, 322 U. S. 607, 620-22.

specific and positive. Section 303(g) of the Communications Act provides that the Commission shall:

> "Study new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest;"

The scope of the duty contained in Section 303(g) was in issue in *National Broadcasting Company* v. *United States*, 319 U. S. 190. There this Court held that the statutory directive in Section 303(g) to encourage the larger and more effective use of radio in the public interest imposed a "comprehensive mandate" upon the Commission (319 U. S. at 219).

The "comprehensive mandate" referred to by this Court obviously includes the duty to consider all available relevant information in carrying out the Commission's obligation to study new uses for radio and generally encourage the larger and more effective use of radio in the public interest.

The administrative practice of the Commission makes it clear that the Commission has up until its decision in this case consistently acted upon the basis that it is under a duty to inform itself in respect of all significant developments in radio research.

In the Commission's Report of May 28, 1940, in which the Commission refused to set commercial standards for television because of the prospect of significant technical advances in the near future, the Commission specifically recognized this obligation in stating that:

> ". . . It would be *a violation of its statutory obligations* for the Commission to disregard *any facts* which might foreclose a proper exercise of its duty to fix transmission standards. . . ." (p. 19)

Nor has the Commission in carrying out its rule-making functions in the establishment of transmission standards in the past deemed that its duty was merely the passive one of considering only such evidence as was adduced by interested parties before the Commission in a formal proceeding.

In the setting of standards for AM and FM sound broadcasting and for television the Commission has heretofore recognized that its mandate to serve the public includes a broad responsibility to consider relevant information from all sources.* For example, the Commission has stated that its FM and black and white television "standards are based upon the *best engineering data available*, including evidence at hearings, conferences with radio engineers and data supplied by manufacturers of radio equipment and by licensees of . . . broadcast stations"**.

The Commission's recognition of its affirmative obligation to search out the facts relevant to proposed rules was evidenced in the early stages of the proceedings which culminated in the order under review. On July 19, 1949 the Commission sent a letter to all experimental television licensees requesting that these licensees send to the Commission all the information which they had with respect to color television. This letter stated that:

> ". . . the Commission wishes to base any decision . . . on the latest and fullest data . . ."

However, the action which the Commission took in this case indicates that it believes its responsibility to the public to base any decision "on the latest and fullest data" ceased when the taking of testimony was completed.

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* As to AM sound broadcasting, see 47 CODE FED. REGS., p. 118 (1949).

** 47 CODE FED. REGS., pp. 205, 245 (1949).

On that theory it refused to consider information of controlling significance concerning scientific developments submitted to it after the testimony was completed on May 26, 1950 but prior to its order of October 10, 1950.

B. Material Disregarded Was of Controlling Significance.

The taking of testimony in the administrative proceedings was completed on May 26, 1950. During that phase of the proceedings, there was testimony by informed witnesses as to what developments were possible with the RCA system.

On July 31, 1950 RCA submitted to the Commission and distributed throughout the industry its Progress Report which stated that certain important developments which had been forecast in the testimony had, since the completion of testimony, actually been accomplished.

On July 10, 1950 the Report of the Condon Committee was released*. In its report the Condon Committee stated its hope that "the report will provide a comprehensive and understandable basis on which the technical factors may be considered in arriving *at a decision*".

After the Commission in its First Report of September 1 disregarded all this information, RCA submitted these two reports as part of its Comments which had been requested by the Commission at the time it issued its First Report.

The materiality of these two Reports in considering whether the Commission was justified in disregarding them lies primarily:

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* The Condon Report was printed as SEN. Doc. No. 197, 81st Cong., 2d Sess. (1950). See R. 330-97.

1. In their authoritativeness and in the conflict between them and the Commission's findings upon which its order is supposedly based; and

2. The reference in those Reports to important facts which had not theretofore been available to the Commission.

The Condon Committee was the most distinguished group of scientists who have ever undertaken to study and report the status of color television. These scientists, in their Report, made findings on highly technical matters involved in a judgment of the relative merits of the respective color systems on the basis of evidence which was broader than that in the Commission's record.

In contrast to the Condon Committee, only two of the seven members of the Commission have even had technical training and one of those two dissented from the adoption of the order. He was formerly Chief Engineer of the Commission. The remaining five are laymen.

With respect to the Condon Report, the majority of the District Court stated:

> "No doubt this report refutes numerous of the findings made by the Commission and gives a far more favorable appraisement of the RCA system than that attributed to it by the Commission." (R. 873).

Similarly, the findings by the Commission with respect to the developments possible with the RCA system were based upon its rejection of testimony which had been confirmed in large part by the accomplishments reported in the RCA Progress Report. There is substantial conflict between the findings of the Commission as to what could not be done with the RCA system and what the Progress Report stated had already been done.

Thus the objectively ascertainable facts stated in the RCA Progress and Condon Reports—facts which were available to the Commission before the issuance of even its First Report and which, as will be shown, were a part of the administrative record before the issuance of its order—conflict in important respects with the fundamental findings upon which the Commission's Reports and order rest.

There is set forth in Appendix B under the headings used by the Commission in its First Report some of the conflicts between the Condon Committee Report and the RCA Progress Report on the one hand, and the Commission's findings on the other. These conflicts were called to the attention of the Commission in the RCA Comments which were submitted prior to the issuance of the Commission's order (R. 316-20).

C. Attempted Justification of Refusal to Consider These Reports.

The appellees, in their Motion to Affirm in this Court and in the court below, have sought to justify the Commission's refusal to consider the RCA Progress Report and the Condon Report on several grounds.

One of these is that the RCA Progress Report and the Condon Reports were not part of the record. This contention will be dealt with in the following sub-section of this brief.

The other grounds upon which appellees seek to justify the Commission's dereliction are that:

> (1) The RCA Progress Report "made no claim of satisfactory and definable development" and no showing of developments which had been carried beyond the stage of "paper presentation" (Commis-

sion's Reply Brief in District Court, p. 3; Motion to Affirm, p. 22).

(2) RCA "never requested that the record be reopened" for the purpose of considering these Reports (Motion to Affirm, p. 21).

(3) The Commission was legally precluded from considering such material (Motion to Affirm, pp. 21, 23).

The first of these contentions, that the RCA Progress Report "made no claim of satisfactory and definable development" (Commission's Reply Brief in District Court, p. 3) and that the RCA Progress Report made no showing of developments which had been carried beyond the stage of "paper presentation" (Motion to Affirm, p. 22) simply does not accord with what was actually stated in the RCA Progress Report.

The RCA Progress Report set forth facts. These were attainments capable of objective ascertainment. For example, it was therein reported that the resolution or picture detail provided by the RCA tri-color tube receivers had been increased because of the increase of the number of phosphor dots on the face of the tubes from 351,000, the figure referred to by the Commission in its First Report, to 600,000. (R. 128, 400)

Whether RCA had succeeded in increasing the number of dots from 351,000 to 600,000 is not a matter upon which reasonable men can differ. Either it had been done or it had not been done. To characterize an unequivocal statement of an accomplished fact such as this as "no claim of satisfactory and definable development" or a development which has not been carried beyond the stage of "paper presentation" is not accurate.

The second argument the appellees have resorted to in their effort to justify the Commission's disregard of the RCA Progress and Condon Reports is that "RCA never requested that the record be reopened" for the purpose of considering these reports.

In the first place, the Commission has an affirmative duty and a responsibility of its own to the public to keep itself informed and to avoid issuing rules designed to operate for the indefinite future on the basis of false assumptions of fact. The Commission's duty in rule-making proceedings is to reach the right result regardless of what any party appearing before it does or does not do.

In the second place, prior to the issuance of the order, RCA specifically invited the attention of the Commission to its duty to consider the facts stated in the RCA Progress Report and in the Condon Report. In the RCA Comments which were submitted to the Commission on September 28, 1950 in response to the Commission's request, RCA pointed out that the statements set forth in the RCA Progress Report confirmed the testimony during the hearing of industry experts and the statements in the Condon Report as to the merits and potentialities of the RCA system. The RCA Comments also stated:

> "We believe that in a rule-making proceeding of the importance of this one, it is the duty of the Commission, before making findings at odds with those of a group of scientists of the stature of the Condon Committee, to keep the record open and to inform itself as to the basis for the findings of that Committee.
>
> "We believe that, in the circumstances, the Commission had the same obligation with respect to the RCA Progress Report. That report was given to the Commission a month before its decision. If the testi-

> mony of the electronics experts to whom we have referred had been accepted, there would of course have been no need to consider a report which said that improvements which had been promised during the hearing had actually been accomplished. But a decision was drafted which rejected that testimony and outlawed a system on the basis of alleged defects which the Progress Report said had already been eliminated. This, we submit, was to turn its back on evidence when the Commission had an obligation to look." (R. 300-01)

In the third place, the argument that RCA did not ask that the record be reopened is wholly disingenuous. In the District Court the appellees expressly stated of the RCA Petition of October 4 (prior to the adoption of the order), which was denied by the Commission:

> "Although not so entitled, this petition for a delay was essentially one to reopen the record." (Appellees' Brief in the District Court, p. 49)

In their next argument, the appellees have gone beyond the contention that an agency which is under a duty to promote the public interest and which is engaged in a rule-making proceeding involving the evaluation of a dynamic science can lawfully refuse to inform itself of pertinent and determinative data fully available to it.

Appellees even contend that the Commission was legally precluded from considering such material. Thus, the Motion to Affirm repeats the position taken by the Commission before the District Court to the effect that consideration by the Commission of either the Condon Report or the RCA Progress Report would have been legally improper (Motion to Affirm, pp. 21, 23).

If administrative agencies are to take the position that they are legally precluded from considering pertinent facts in a rule-making proceeding, the administrative process is certain to stultify itself.

One of the chief purposes underlying the creation of the administrative process was the need for a flexible governmental body—a body possessed of the procedural latitude necessary to gather and to consider all relevant information when it was engaged in the promulgation of rules affecting the public interest. It was recognized that the judicial process, circumscribed as it is by various formalities, including a formal record, was less adapted to cope with many of the complexities of modern civilization.

As stated by James M. Landis in *The Administrative Process* (1938):

> "One other significant distinction between the administrative and the judicial processes is the power of 'independent' investigation possessed by the former. The test of the judicial process, traditionally, is not the fair disposition of the controversy; it is the fair disposition of the controversy *upon the record as made by the parties**. . . . the judge must not know of the events of the controversy except as these may have been presented to him, in due form, by the parties." (pp. 37-38)

In contrast,

> "For that [administrative] process to be successful in a particular field, *it is imperative that controversies be decided as 'rightly' as possible, independently of the formal record the parties themselves produce.* The ultimate test of the administrative is the policy that it formulates; not the fairness as between the

* Italics in original.

> parties of the disposition of a controversy on a record of their own making." (p. 39)

Similarly, Kenneth Culp Davis, Professor of Law at The University of Texas, has stated:

> "Congress has assigned to each regulatory agency the affirmative duty of securing all relevant information, whether produced by the parties or not."*

The Commission's position now that it was legally precluded from considering this pertinent and controlling data is in contrast to the position taken by it before this Court in *National Broadcasting Company* v. *United States*, 319 U. S. 190. In the present case the Commission has attempted to rationalize its disregard of the Condon Report in part on the basis that it was "off the record", and in part because it was made to the Senate Interstate and Foreign Commerce Committee (Appellee's Brief in District Court, p. 28). In the *National Broadcasting* case, on the other hand, the Commission, in a rule-making proceeding, had used data which were not introduced in evidence at the hearings and part of which was not a matter of public record or even of common knowledge. This data included "testimony presented before the Senate Committee on Interstate Commerce" (Government Brief in that case, p. 130).

In the 1943 brief, the Commission, speaking of the rule-making proceeding held in the *National Broadcasting* case, pointed out that

> ". . . the commission was not here conducting a negligence case. . . . this Court, as well as administrative law commentators, have recognized . . . that the requisites of a hearing preceding administrative

* *Official Notice*, 62 HARV. L. REV. 537, 542 (1949).

rule-making may differ from those preceding an adjudication.

* * * * * *

"The touchstone, then, [in rule-making] is not perfect conformity to the procedure of judicial hearings, but, broadly, its fairness as affording full opportunity to present relevant facts and arguments." (Government Brief in *National Broadcasting* case, pp. 131-33)

Thus, the Commission in 1943 advocated principles which go beyond those for which appellants now contend, for, as will be shown in the following section, the data disregarded by the Commission in its color decision were part of the record.

D. Violation of Administrative Procedure Act.

Not only did the Commission violate its obligations under the Communications Act; the Commission's refusal to consider relevant matter presented violated the Administrative Procedure Act as well.

Section 4(b) of the Administrative Procedure Act, dealing with rule-making proceedings, provides in part:

"After notice required by this section, the agency shall afford interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments with or without opportunity to present the same orally in any manner; and, *after consideration of all relevant matter presented*, the agency shall incorporate in any rules adopted a concise general statement of their basis and purpose."

Appellants believe that this requirement that the administrative agency shall consider

"... *all* relevant matter presented ..."

means just what it says.

After the Commission in its First Report refused to consider the Condon Report and the RCA Progress Report, RCA submitted these Reports as part of its Comments, which had been requested by the Commission. The Reports thus became a part of the administrative record.

But the Commission has admitted that in issuing its order it did not consider the Report of the Condon Committee nor the RCA Progress Report. In respect of the former, for example, it said in its brief in the District Court:

> "This Report was not part of the record before the Commission. ... It is obviously improper to consider such a report ..." (p. 28)

Although the proceedings before the Commission were clearly rule-making proceedings, the appellees now attempt to justify the Commission's refusal to consider "relevant matter presented" on the ground that somehow this rule-making proceeding was different from other rule-making proceedings. They endeavor to differentiate on the ground that in this proceeding there was a "testimonial hearing" (Motion to Affirm, p. 23).

This differentiation, it is submitted, is not in accord with the statute. Nor is it in accord with the Commission's express statement that in establishing "rules and regulations, *and engineering standards*, ... it *must conform to the Administrative Procedure Act* which prescribes uniform rule-making practices for Federal agencies to follow" (16 FCC ANN. REP. 13-14, (1950)).

The statute provides that interested persons shall be given an opportunity to "participate in the rule making through submission of written data, views, or arguments *with or without* opportunity to present the same orally in any manner. . . ." The statute does not set up two alternative procedures—one covering written data and the other an oral presentation. It shows on its face that the oral presentation is *in addition* to the "written data, views, or arguments". The statute directs that the agency shall consider "*all* relevant matter presented". The word "*all*" covers both the written and the oral presentations.

It is submitted that Section 4(b) of the Administrative Procedure Act does not permit an agency to refuse to consider written data submitted in those cases in which opportunity for oral presentation is afforded nor to pick and choose what relevant matter it will consider.

The Government's attempt to confine the application of Section 4(b) to rule-making proceedings in which no testimonial hearings are held has no support in the statute.* The Condon and RCA Progress Reports were part of the administrative record.

E. Illegal and Impossible Conditions Imposed by Commission on Considering Additional Data.

The Commission in its First Report recognized its need for further information with respect to the CBS system before the ultimate conclusion could be reached that adoption of that system was in the public interest. The Com-

* If considerations of fairness required, as appellees have stated, "that the record be reopened for the introduction of these reports as evidence subject to cross-examination by the other parties", that is precisely what the Commission should have done (Motion to Affirm, p. 21).

mission stated that the adoption of the CBS system without more information would mean that the Commission was

> "compelled to speculate as to an important basis for its decision . . ."

and that

> "the Commission's determination on an important part of its decision would be based on speculation and hope . . ." (R. 165)

The Commission also specifically noted in its First Report the desirability of obtaining further information as to improvements in existing compatible systems and new compatible systems before reaching a final decision (R. 165-66).

Nevertheless, the Commission a little over a month later disregarded the further information which it had received regarding the RCA system, rejected a proposal whereby it could have confirmed for itself the facts reported, swallowed its own expressed "speculation and hope" about the CBS system, and adopted that system finally without going into the matters with respect to which it said it should have further information.

This was done in spite of the recognition by the Commission in its First Report that:

> "the institution of these proceedings stimulated great activity in the color field and that since fundamental research cannot be performed on schedule, it is possible that much of the fruit of this research is only now beginning to emerge." (R. 166)

The immediate reaction is why did the Commission adopt its order without obtaining the evidence with respect to the CBS system which the Commission itself had recog-

nized was needed and without even considering the improvements in the RCA system?

The Commission seemed to have set itself a straightforward job to do. That was to get the proof which its First Report had indicated the Commission ought to have on the deficiencies of CBS in respect of direct-view picture size, and picture detail, and on improvements in the RCA and other compatible systems.

But the Commission referred to what it called "the aggravation of the compatibility [*sic*] situation" (R. 166). This was the Commission's way of saying that, as the number of black and white sets in the hands of the public was increasing rapidly, the capriciousness of adopting a color system that would give no picture at all on those sets would become more and more evident.

The Commission said it would take the additional proof it needed only if the television manufacturing industry—*over which the Commission has no jurisdiction whatsoever**—would comply with two conditions.

Those conditions were (R. 166-68):

> (a) That manufacturers of television receivers agree to change their entire production of black and white television receivers, from and after early November 1950, to a wholly new and basically different design which would operate on a continuously variable or "bracket" set of black and white standards (including the number of lines and fields called for by the CBS standards); and

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* This has been conceded by the Commission. As was stated by the Commission to the District Court:

> "The Commission's jurisdiction is over the standards of broadcast transmissions, not over the equipment built by receiver manufacturers." (Appellees' Brief, District Court, p. 45.)

(b) That no one contest this immediate and major change by the Commission, *without a hearing*, in the standards for black and white television which had been put in effect in 1941 after extensive hearings.

The Commission said that if these conditions were not met it would adopt forthwith the CBS color system.

The Commission attempted in the court below to deny that the foregoing were "conditions" (Appellees' Brief, pp. 44, 46). This effort by the Commission overlooks its own statement in the 16th Annual Report of the Commission for the fiscal year ending June 30, 1950 which was submitted to Congress pursuant to the provisions of the Communications Act. In that Report the Commission stated:

> "However, in view of the compatibility [*sic*] problem and the possibility of improvements in TV color systems generally, the Commission proposed postponing a color decision and adopting monochrome 'bracket standards' which would enable black-and-white TV sets incorporating those standards to receive CBS color transmissions *in monochrome*. This proposal was *conditioned* to receiver manufacturers agreeing to equip future TV sets with a manual or automatic switch for that purpose." (p. 10)

Bracket standards were the heart of the Commission's conditions for considering further information with respect to color television. But the Commission's Notice of Further Proposed Rule Making which instituted the color hearings had made no mention of bracket standards. Nor was there a scintilla of evidence with respect to them during the hearings.

As one Commissioner, the former Chief Engineer, stated in his dissent (R. 421):

> "The subject of bracket standards was not at issue in the hearing nor was the subject even ad-

> vanced during the hearing. . . . the subject of bracket standards was a new concept in field and line scanning proposed after the hearing record closed. It came as a surprise to industry and was not based upon information appearing in the record of this proceeding."

The Commission requested that the television manufacturers "submit comments" (R. 167). Manufacturers representing most of the industry production responded. Almost without dissent they pointed out to the Commission that it would be impossible to get into commercial production of the basically different "bracket standard" receivers within the time required by the Commission, or any approximation of that time. (See dissenting opinion of Commissioner Sterling (R. 421-29)).

It was also pointed out that the present black and white standards should not be abolished, *without a hearing*, in favor of the major change in those standards proposed by the Commission (R. 307-09).

The Commission's bracket standards proposal, if accepted, would have made it impossible for the public to buy present models of receivers. Thus the Commission proposed to force the public to pay the added cost of black and white receivers capable of operating (although with an admittedly degraded picture) in black and white on the CBS color system as well as on present standards. Accordingly, the first part of the RCA Comments was directed to this purely color reason for the proposed change in the black and white television standards.

RCA also pointed out in its Comments, that, if the television manufacturers had to modify their receiver production to meet the two conditions laid down by the Commission, the result would be not only to raise the cost to the consumer of television receivers but as well to lower the

already critically short supply of television receiver components (R. 315-16).

RCA pointed out that since the start of the Korean conflict, industrial activity has increased substantially, resulting in increasing shortages of certain materials and making the procurement of certain television components much more difficult. The additional components which would be needed for bracket standard receivers use iron, steel, copper, nickel, tin and tungsten, all of which have been found by the National Production Authority in its first regulation* issued on September 18, 1950 to be in critically short supply (R. 315).

RCA also pointed out to the Commission that never before had an administrative body of the United States undertaken to coerce the freedom of choice of American manufacturers in what they may build and sell under threat that if they do not obey, drastic consequences to the public would follow (R. 316).

The Commission was urged to withdraw from its position.

After it became apparent from the comments of the industry that the Commission's "bracket standards" conditions were impossible to comply with, RCA, by its Petition of October 4, 1950, formally asked the Commission to take the evidence it had said it needed, without insisting on the impossible conditions (R. 408-09).

This the Commission refused to do. It denied the RCA Petition and, on October 10, adopted the CBS system without taking any additional evidence.

The Commission had committed itself that unless the industry accepted impossible conditions the CBS system would be adopted at once. It had threatened the industry

* 15 FED. REG. 6253 (September 19, 1950).

that unless these impossible conditions were accepted it would not consider reopening the hearings.

And as the conditions could not be met the hearings were not reopened. The Commission's threat was carried out.

It was carried out even though the Commission had expressly asked for comments of the industry on its proposed action. Presumably the Commission believed that it was possible to meet its condition with respect to the manufacture of bracket standard receivers. Otherwise this condition was not imposed by the Commission in good faith.

Two Commissioners dissented from the adoption of the order (R. 421-29, 429-31). They realized that the fiasco of "bracket standards" called for reconsideration. They knew that its willingness to consider improvements *only on impossible and illegal conditions* could not be defended.

But the Commission—or a majority of the Commission—was unwilling to admit such a blunder. They preferred to take their chances on *"speculation and hope"*.

POINT V.

The Court Below Did Not Afford Appellants Proper Judicial Review.

A. The Standard Of Judicial Review Applied By The Court Below Was Incorrect.

The court below proceeded on the basis of a misconception as to the standard of judicial review which it is required to follow. In its opinion, the court below stated ". . . we must give recognition to our limited scope in reviewing an order of an administrative agency." (R. 866)

It cited cases which it stated "so firmly delineated" the "scope of review" which it applied (R. 867).* These cases were all decided prior to the passage of the Administrative Procedure Act. But since this case was decided in the three-judge District Court, this Court has held that under that Act

> "courts must now assume more responsibility for the reasonableness and fairness of . . . [administrative] decisions than some courts have shown in the past."

Universal Camera Corp. v. *National Labor Relations Board*, 19 U. S. L. Week 4160 (U. S. Feb. 26, 1951).**

Not only is it apparent on the face of the opinion of the court below that it too drastically restricted itself in its judicial function, but in the *Universal Camera Corporation* case this Court specifically noted that the Seventh Circuit had followed a standard of judicial review contrary to that which this Court has now held to be proper.

Under the holding of this Court in the *Universal Camera Corporation* case, the court below had the duty with respect

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* The cases were *American Telephone & Telegraph Co.* v. *United States*, 299 U. S. 232; *Federal Security Administrator* v. *Quaker Oats Co.*, 318 U. S. 218; and *National Broadcasting Company* v. *United States*, 319 U. S. 190.

** Appellees cited the same three cases in their Motion to Affirm (p. 13), as did the District Court, plus two additional cases (p. 15). The two additional cases were *National Labor Relations Board* v. *The Pittsburgh Steamship Co.*, 337 U. S. 656, and *United States* v. *Yellow Cab Co.*, 338 U. S. 338, at page 341 where the *Pittsburgh Steamship Company* case is cited. Since the appellees filed their Motion to Affirm, this Court has again ruled in the *Pittsburgh Steamship Company* case. In giving the opinion of a unanimous Court on February 26, 1951, holding that the scope of judicial review of action by administrative agencies had been extended by

to the decision of the Commission to determine whether "the evidence supporting that decision is substantial, *when viewed in the light that the record in its entirety furnishes.*" This it did not do. Indeed, the court side-stepped this question by stating (R. 871):

> "While the findings of the Commission are severely criticized, it is not contended in the main that they are not supported by substantial evidence."

Contrary to the view of the District Court, appellants contend and have contended throughout this case that there is no substantial support for the findings and order of the Commission.

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the Administrative Procedure Act and the Taft-Hartley Act, Mr. Justice Frankfurter stated:

> "The case is before us for the second time. It arises from the petition of the Pittsburgh Steamship Company to review an order of the Board, entered August 13, 1946, directing it to reinstate a dismissed employee and to terminate what were found to be coercive and discriminatory labor practices. 69 N. L. R. B. 1395. The Court of Appeals originally denied enforcement on its finding that the order was vitiated by an underlying bias on the part of the trial examiner. 167 F. 2d 126. On certiorari, we rejected the Court of Appeals' conclusion that resolution of every controverted fact in favor of the Board established invalidating bias on the examiner's part. We also found that the record disclosed 'evidence substantial enough under the Wagner Act.' 337 U. S. 656, 661. That conclusion, it is proper to say, was reached on the assumption that under the Wagner Act substantiality was satisfied if there was evidence in the record in support of the Board's conclusions. But we remanded the case to the Court of Appeals to consider the effect on its reviewing duty of the Administrative Procedure and the Taft-Hartley Acts, both having come into force between the Board's order and the Court of Appeals decision. The Court of Appeals has now held in accordance with our own view, that the scope of review had been extended 'beyond the requirements of the Wagner Act,' 180 F. 2d 731, 736, and that in the light of the new requirements the record considered as a whole disentitled enforcement of the order."

In appellants' complaint, filed in the court below, it is stated (R. 13):

> "The Commission's Order is illegal, void and beyond the power, authority and jurisdiction of the Commission for the following reasons:
>
> • • • • • •
>
> "(c) The Order is unsupported by substantial evidence . . ."

In appellants' brief filed November 13, 1950 in the court below, Point III thereof was entitled "The Order of the Commission is Arbitrary and Capricious and is Not Supported by Substantial Evidence." This point consisted of 27 pages.

In appellants' reply brief in the court below, filed November 28, 1950, Point II thereof was entitled "Reply to Alleged 'Basic Findings'—They Are Not Supported by Substantial Evidence and They Do Not Support the Order." This Point covered 21 pages of the reply brief. Supplementing this Point were two annexes to the brief consisting of an additional 21 pages.

That the appellants did contend in the court below that the order is not supported by substantial evidence has been recognized by the appellees. In the Motion to Affirm filed in this Court on behalf of the Commission and CBS, it is stated (p. 14):

> ". . . appellants urged in the Court below, and urge here, that there was no substantial supporting evidence . . ."

In these circumstances, it is submitted that the court below could not properly avoid, as it did, the duty of reviewing "the record as a whole" to see whether the order and findings of the Commission were supported by substan-

tial evidence. The result is that appellants have been deprived of the judicial review to which, on the basis of this Court's decisions, they are entitled. *Universal Camera Corp.* v. *National Labor Relations Board,* 19 U. S. L. Week 4160 (U. S. Feb. 26, 1951); *National Labor Relations Board* v. *The Pittsburgh Steamship Co.,* 19 U. S. L. Week 4136 (U. S. Feb. 26, 1951).

B. District Court's Failure To Give Proper Judicial Review In Other Important Respects.

In the instant case, it is submitted, appellants were not afforded by the court below the judicial review to which they are entitled with respect to other important issues in this case. Many of the important questions involved in this case were left unresolved by the District Court.

Thus, the District Court's opinion did not mention the contentions that:

1. The adoption of incompatible color television standards was contrary to the statutory standard of public interest which governs Commission action.

2. The refusal to adopt compatible color television standards was arbitrary and contrary to the statutory standard of public interest.

3. The ruling out of the broadcasting of a compatible system in competition with an incompatible system was contrary to law.

4. The Commission's action in this respect is not supported by the Commission's findings.

5. The Commission, by refusing to consider relevant matter presented, violated the Administrative Procedure Act.

6. The order of the Commission is unlawful in that it was based upon the non-compliance of television manufacturers with conditions which the Commission had no authority to impose and with which compliance was impossible.

The District Court mentioned but did not resolve the contentions that:

1. The evidence alleged to support the order was evidence taken early in the hearings which had been superseded and rendered obsolete by evidence of later technical developments achieved during the course of the hearings.

2. The Commission had abused its discretion and violated statutory command in refusing to consider relevant matter submitted, at the Commission's request, after the close of the testimony but before the close of the administrative record.

The reason for this failure to make any decision on so many contested and decisive points is apparent on the face of the District Court's opinion. The District Court, it appears, intended to leave the decision of the case to this Court.

Thus, the majority of the District Court stated (R. 866):

> "... we have been unable to free our minds of the question as to why we should devote the time and energy which the importance of the case merits, realizing as we must that the controversy can only be

> finally terminated by a decision of the Supreme Court. This is so because any decision we make is appealable to that court as a matter of right and we were informed during oral argument, in no uncertain terms, that which otherwise might be expected, that is, that the aggrieved party or parties will immediately appeal. In other words, this is little more than a practice session where the parties prepare and test their ammunition for the big battle ahead."

In addition, in giving the basis for its order dismissing the complaint and allowing defendants' motion for summary judgment, the majority of the District Court said (R. 875):

> "Thus, as we evaluate the situation, there are *two* courses open, (1) to allow defendants' motion for a summary judgment, and (2) to vacate the order and send the proceeding back to the Commission for further consideration in view of recent developments in the color television field as well as the rapidly changing economic situation. A pursuance of the latter course, assuming we have such authority, of which there may be doubt, would inevitably result in the prolongation of the controversy which badly needs the finality of decision which can be made only by the Supreme Court. In other words, the interests of all, so we think, will be better served with this controversy on its way up rather than back from whence it comes."

For all practical purposes, therefore, appellants have not been given their day in court. Under established law, in these circumstances the judgment of the court below should be reversed. *Lutcher & Moore Lumber Co.* v. *Knight*, 217 U. S. 257; *Ex parte Harley-Davidson Motor Co.*, 259 U. S. 414; *Oklahoma Natural Gas Co.* v. *Russell*, 261 U. S. 290; *Federal Communications Commission* v. *WJR, The Goodwill Station, Inc.*, 337 U. S. 265.

C. Relevant Matter Presented To The Commission Not Properly Considered By Court Below.

It has been pointed out above that two relevant and significant reports, namely, the report of the Condon Committee and the RCA Progress Report, were presented to the Commission and that the Commission refused to consider them. In the court below, appellants contended that this refusal of the Commission was improper and unlawful.

In endeavoring to dispose of this contention, the court below stated that such matters were "not properly before the court" and that: "A consideration of such matters would in effect amount to a trial *de novo*, which we are without power to grant" (R. 872).

Such a consideration by the court below, appellants submit, would be in no sense a trial *de novo*. On the contrary it is merely the normal function which any reviewing court must perform in order to determine whether evidence was impfoperly excluded.

In many cases, of course, only an offer of proof is available for consideration by the reviewing court. In the instant case, however, instead of being the subject of an offer of proof, the documents were actually a part of the administrative record. Indisputably they were physically in the record before the court below.

Only by looking at the documents themselves could the District Court determine whether the Commission had acted lawfully in refusing to consider them.

If the view of the court below in this respect were to prevail, it would mean that there would be no way whereby an aggrieved party could secure judicial review of the action of an administrative agency in excluding or refusing to consider evidence which the aggrieved party contends is of controlling importance.

POINT VI.

The Commission's Reliance Upon a Member of Its Engineering Staff Who Had an Interest in the Outcome Was Improper.

A decision with respect to the relative merits of television systems on technical grounds requires a high degree of technical competence. Of the seven Commissioners, however, five are laymen and only two have had technical training.* On this state of facts it was essential that the Commission obtain from its engineering staff the most competent and the most disinterested technical advice possible.

Instead, the Commission relied for technical assistance upon a staff engineer who had an interest in the adoption of the incompatible CBS system. Chapin had invented a device usable with the incompatible CBS system but not with a compatible color system. He had assigned this invention to the government.

The salient facts with respect to this staff engineer, as set forth in appellants' complaint and affidavits and not denied in any of the appellees' affidavits, motions or briefs are as follows:

1. The Commission staff engineer, Chapin, took a most active role throughout the hearings and was in charge of the Commission's laboratory which tested the color systems. He had an interest of professional prestige and reputation in the adoption of the CBS system although no financial interest, and supported the CBS system throughout the hearings. He was the only witness other than CBS witnesses who supported an incompatible system (R. 581-82).

* One of these two, who was formerly Chief Engineer of the Commission, dissented from the adoption of the order.

2. In weighing the highly technical issues before it, the Commission relied upon this engineer's advice (R. 12-13, 558, 581).

3. This engineer advised the Commission in the absence of the proponents of color systems and participated in the formulation and preparation of the order and Reports of the Commission which are under review (R. 13, 558, 581).

Chapin's predisposition in favor of the CBS system is apparent from the administrative record. To illustrate, part of the testimony which he gave during the hearing consisted of an alleged comparison of the RCA color receivers with CBS color receivers. Chapin claimed that CBS receivers were superior to the RCA receivers because the latter were too big and complex. Actually Chapin's testimony related to certain receivers having over 100 tubes, which were used by RCA in the early part of the color hearing (Tr. 10627).

Chapin made no reference to the RCA tri-color tube receivers demonstrated by RCA. These receivers were substantially of the same size as present commercial model black and white receivers. One type of RCA tri-color tube receiver used only 46 radio tubes; another used only 37 tubes—just 10 more than the commercial model black and white receivers of comparable type (Tr. 8131, 10630).

These receivers were demonstrated informally to members of the Commission's staff, including Chapin, on March 23, 1950. On the very day Chapin saw this demonstration he prepared the exhibit on which he based his testimony comparing the CBS color receivers with the RCA color receivers. His testimony was given on April 11—nineteen days after he had seen a demonstration of the simplified and compact RCA receivers. But Chapin took no account in his own presentation to the Commission of these simplified RCA receivers (Tr. 10627-32).

On cross-examination by RCA counsel, Chapin admitted that the very latest disc receiver demonstrated by CBS was *larger* than the receivers shown by RCA on March 23 (Tr. 10631-32). And on the point of complexity, Chapin had to concede that the issue is now at least a stand-off as between RCA and CBS (Tr. 10632).

But the Commission's findings read as if Chapin's cross-examination had never occurred (R. 153, 160, 414).

In their Motion to Affirm in this Court, the appellees have argued that no error resulted from the Commission's reliance upon Chapin; first, because the objection by RCA when Chapin's interest became known was not properly phrased, and second, because it is not shown that the Commissioners were themselves biased (Motion to Affirm, p. 26).

Appellants submit that the objection made by RCA did raise for the Commission's consideration the question whether Chapin should be allowed to continue in the proceedings. The Commission's obligation to the public to avoid bias on the part of its staff is not a contingent one which becomes fixed only if certain magic words are spoken. The Commission's attention was directed to the point (Tr. 5980-82). This was enough.

So also with the argument that appellants have not shown that the Commissioners were themselves biased. As is true of many agencies dealing with complex scientific and technical problems, this is essentially a lay Commission. When passing on such problems, the technical findings which such an agency makes necessarily depend on the technical advice which it gets. The public has a right to expect that those members of its staff who are permitted to participate in the decision-making process will be free from personal interest in the Commission's decision.

As a result of the participation of Chapin, the public was deprived of what it had a right to expect—an impartial

analysis by the Commission of all the facts relating to the public interest.

Chapin participated in the decision-making process. His testimony and that of CBS was accepted and acted on by the Commission. The testimony of completely impartial scientists and of industry experts was tossed aside, and a system was adopted against the advice of substantially all the outstanding electronic organizations in the United States that the CBS system is neither the best available nor the system to provide a sound color service on a national basis.

Conclusion.

For these reasons it is submitted that the decision of the District Court dismissing appellants' complaint should be reversed and the cause remanded to that court for the issuance of a permanent injunction against the order.

Respectfully submitted,

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Appendix A.

Text of Statutes Involved

A. Communications Act of 1934, as amended (47 U. S. C. §151 *et seq.*)

§303. Except as otherwise provided in this chapter, the Commission from time to time, as public convenience, interest, or necessity requires, shall—

* * * * * *

(c) Assign bands of frequencies to the various classes of stations, and assign frequencies for each individual station and determine the power which each station shall use and the time during which it may operate;

* * * * * *

(e) Regulate the kind of apparatus to be used with respect to its external effects and the purity and sharpness of the emissions from each station and from the apparatus therein;

(f) Make such regulations not inconsistent with law as it may deem necessary to prevent interference between stations and to carry out the provisions of this chapter: *Provided, however,* That changes in the frequencies, authorized power, or in the times of operation of any station, shall not be made without the consent of the station licensee unless, after a public hearing, the Commission shall determine that such changes will promote public convenience or interest or will serve public necessity, or the provisions of this chapter will be more fully complied with;

(g) Study new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest. (48 Stat. 1082).

* * * * * *

§402. (a) The provisions of Title 28, relating to the enforcing or setting aside of the orders of the Interstate Commerce Commission, are made applicable to suits to enforce, enjoin, set aside, annul, or suspend any order of the Commission under this chapter (except any order of the Commission granting or refusing an application for a construction permit for a radio station, or for a radio station license, or for renewal of an existing radio station license, or for modification of an existing radio station license, or suspending a radio operator's license), and such suits are authorized to be brought as provided in such Title 28. (48 Stat. 1093, as amended, 50 Stat. 197, 63 Stat. 108).

B. Judicial Code (28 U. S. C.)

§1253. Direct appeals from decisions of three-judge courts.

Except as otherwise provided by law, any party may appeal to the Supreme Court from an order granting or denying, after notice and hearing, an interlocutory or permanent injunction in any civil action, suit or proceeding required by any Act of Congress to be heard and determined by a district court of three judges. (62 Stat. 928)

• • •

§1336. Interstate Commerce Commission's orders.

Except as otherwise provided by Act of Congress, the district courts shall have jurisdiction of any civil action to enforce, enjoin, set aside, annul or suspend, in whole or in part, any order of the Interstate Commerce Commission. (62 Stat. 931)

• • •

§2323. Duties of Attorney General; intervenors.

The Attorney General shall represent the Government in the actions specified in section 2321 of this title and in actions under sections 20, 23, and 43 of

Title 49, in the district courts, and in the Supreme Court of the United States upon appeal from the district courts.

The Interstate Commerce Commission and any party or parties in interest to the proceeding before the Commission, in which an order or requirement is made, may appear as parties of their own motion and as of right, and be represented by their counsel, in any action involving the validity of such order or requirement or any part thereof and the interest of such party.

Communities, associations, corporations, firms, and individuals interested in the controversy or question before the Commission, or in any action commenced under the aforesaid sections may intervene in said action at any time after commencement thereof.

The Attorney General shall not dispose of or discontinue said action or proceeding over the objection of such party or intervenor, who may prosecute, defend, or continue said action or proceeding unaffected by the action or nonaction of the Attorney General therein. (62 Stat. 970, as amended 63 Stat. 105.)

C. Administrative Procedure Act (5 U. S. C. § 1001 *et seq.*)

§4. Except to the extent that there is involved (1) any military, naval, or foreign affairs function of the United States or (2) any matter relating to agency management or personnel or to public property, loans, grants, benefits, or contracts. . . .

(a) *Notice.*—General notice of proposed rule making shall be published in the Federal Register (unless all persons subject thereto are named and either personally served or otherwise have actual notice thereof in accordance with law) and shall include (1) a statement of the time, place, and nature of public rule making proceedings; (2) reference to

the authority under which the rule is proposed; and (3) either the terms or substance of the proposed rule or a description of the subjects and issues involved. Except where notice or hearing is required by statute, this subsection shall not apply to interpretative rules, general statements of policy, rules of agency organization, procedure, or practice, or in any situation in which the agency for good cause finds (and incorporates the finding and a brief statement of the reasons therefor in the rules issued) that notice and public procedure thereon are impracticable, unnecessary, or contrary to the public interest.

(b) *Procedures.*—After notice required by this section, the agency shall afford interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments with or without opportunity to present the same orally in any manner; and, after consideration of all relevant matter presented, the agency shall incorporate in any rules adopted a concise general statement of their basis and purpose. Where rules are required by statute to be made on the record after opportunity for an agency hearing, the requirements of sections 1006 and 1007 of this title shall apply in place of the provisions of this subsection.

(c) *Effective dates.*—The required publication or service of any substantive rule (other than one granting or recognizing exemption or relieving restriction or interpretative rules and statements of policy) shall be made not less than thirty days prior to the effective date thereof except as otherwise provided by the agency upon good cause found and published with the rule.

(d) *Petitions.*—Every agency shall accord any interested person the right to petition for the issuance, amendment, or repeal of a rule. (60 Stat. 238, 5 U. S. C. § 1003).

§ 10. Except so far as (1) statutes preclude judicial review or (2) agency action is by law committed to agency discretion.

(a) *Right of Review.*—Any person suffering legal wrong because of any agency action, or adversely affected or aggrieved by such action within the meaning of any relevant statute, shall be entitled to judicial review thereof.

(b) *Form and Venue of Action.*—The form or proceeding for judicial review shall be any special statutory review proceeding relevant to the subject matter in any court specified by statute or, in the absence or inadequacy thereof, any applicable form of legal action (including actions for declaratory judgments or writs of prohibitory or mandatory injunction or habeas corpus) in any court of competent jurisdiction. Agency action shall be subject to judicial review in civil or criminal proceedings for judicial enforcement except to the extent that prior, adequate, and exclusive opportunity for such review is provided by law.

(c) *Reviewable acts.*—Every agency action made reviewable by statute and every final agency action for which there is no other adequate remedy in any court shall be subject to judicial review. Any preliminary, procedural, or intermediate agency action or ruling not directly reviewable shall be subject to review upon the review of the final agency action. Except as otherwise expressly required by statute, agency action otherwise final shall be final for the purposes of this subsection whether or not there has been presented or determined any application for a declaratory order, for any form of reconsideration, or (unless the agency otherwise requires by rule and provides that the action meanwhile shall be inoperative) for an appeal to superior agency authority.

(d) *Interim relief.*—Pending judicial review any agency is authorized, where it finds that justice so requires, to postpone the effective date of any action taken by it. Upon such conditions as may be required and to the extent necessary to prevent irreparable injury, every reviewing court (including every court to which a case may be taken on appeal from or upon application for certiorari or other writ to a reviewing court) is authorized to issue all necessary and appropriate process to postpone the effective date of any agency action or to preserve status or rights pending conclusion of the review proceedings.

(e) *Scope of Review.*—So far as necessary to decision and where presented the reviewing court shall decide all relevant questions of law, interpret constitutional and statutory provisions, and determine the meaning or applicability of the terms of any agency action. It shall (A) compel agency action unlawfully withheld or unreasonably delayed; and (B) hold unlawful and set aside agency action, findings, and conclusions found to be (1) arbitrary, capricious, and abuse of discretion, or otherwise not in accordance with law; (2) contrary to constitutional right, power, privilege, or immunity; (3) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; (4) without observance of procedure required by law; (5) unsupported by substantial evidence in any case subject to the requirements of sections 1006 and 1007 of this title or otherwise reviewed on the record of an agency hearing provided by statute; or (6) unwarranted by the facts to the extent that the facts are subject to trial *de novo* by the reviewing court. In making the foregoing determinations the court shall review the whole record or such portions thereof as may be cited by any party, and due account shall be taken of the rule of prejudicial error. (60 Stat. 243, 5 U. S. C. §1009)

Appendix B.

The objectively ascertainable facts stated in the RCA Progress and Condon Reports—facts which were available to the Commission before the issuance even of its First Report—conflict in important respects with the fundamental findings upon which the Commission's Reports and order rests.

There is set forth below under the headings used in the basic findings of the Commission's First Report some of the conflicts between the Condon Committee Report and the RCA Progress Report on the one hand and the Commission's findings on the other. These conflicts were called to the attention of the Commission in the RCA Comments, which were submitted as part of the record prior to the Commission's order.

In its Petition of October 4, 1950, RCA offered to show to the Commission *nearly four months ago* the improvements made in the performance of the RCA system, with particular reference to those points about which the Commission expressed doubts in its findings.

	Condon Committee Report	RCA Progress Report	First Report of Commission
Description of Systems	"The effectiveness of channel utilization of the RCA color system is the highest of all the systems discussed in this report." (R. 370)		In spite of the Commission's statutory obligation to promote "the more effective" use of the radio spectrum, the Commission's Report did not even mention the relative effectiveness of channel utilization by the RCA and CBS systems.
	RCA is the only system which can make use of the mixed highs principle and its use has been conclusively proved to result in a saving of band width or space in the frequency spectrum. (R. 351-52, 362, 372)		The Commission's Report only stated that it was "claimed" that the use of mixed highs by the RCA system has saved band width. (R. 126) No reference was made to the fact that only the RCA system is able to make use of mixed highs.
	By the use of dot interlace, an integral part of the RCA system, "the resolution of the RCA image is approximately twice as great" as is possible on the same band width without dot interlace. (R. 365)		The Commission found only that RCA "endeavors" to save band space by the process of dot interlace. (R. 126)

	Condon Committee Report	RCA Progress Report	First Report of Commission
Evaluation of Systems (Flicker, motion continuity and allied effects)	Because of the difference between the field repetition rate of the CBS system and the RCA system, the RCA image can be about nine times as bright as the CBS image for equal visibility of large area flicker. (R. 360-61, 368)		This superiority of the RCA system over the CBS system in freedom from flicker was not mentioned.
	"... no adverse effects are noted" from the use of mixed highs. (R. 352)		The so-called "difficulty" which the Commission stated is encountered by the RCA system in maintaining adequate contrast in small areas the Commission said appears to be due, among other things, to the use of mixed highs. (R. 137)
(Brightness—Contrast)		RCA color system receivers utilizing tri-color tubes now produce pictures with highlight brightness of more than 20 footlamberts, and before long brightnesse of 40 to 50 footlamberts will be achieved. (R. 400)	"At none of the demonstrations on the record did any of the RCA color receivers produce sufficient illumination for ordinary home use" and "there is some doubt" whether the RCA system will permit much higher brightness [than 7 footlamberts] on the tri-color tube. (R. 137)

	Condon Committee Report	RCA Progress Report	First Report of Commission
(Color Fidelity)		A red phosphor of proper chromaticity has been developed. (R. 400)	The RCA tri-color tube "suffers from the limitations as to color fidelity which are involved in the use of color phosphors rather than filters." (R. 141)
	Fidelity of color reproduction depends upon what primaries are used and there is "no basic difference in the color fidelity of the three color systems". (R. 362)		This fundamental fact was not mentioned in the Commission's Report.
(Color Fidelity)	". . . no adverse effects" upon color detail results from the use by RCA of dot interlacing and mixed highs, and in particular the use of mixed highs does not result in "appreciable degradation of the color or tonal values of the image." (R. 352, 367)		The Commission asserted that because of RCA's use of mixed highs and the way it incorporates horizontal dot interlace, it appears that color detail in small areas of the picture cannot be faithfully produced. (R. 141)

	Condon Committee Report	RCA Progress Report	First Report of Commission
(Resolution)	"The RCA color image has an over-all resolution approximately equal to that of the black-and-white system". (R. 369)		The Commission found, with respect to the RCA system, that its resolution "even in theory is not equal to that of the present [black and white] system for all types of scenes." (R. 143)
		The resolution afforded by the tri-color tube has been increased because the number of phosphor dots has been increased from 351,000 to 600,000. (R. 400)	"As demonstrated [on April 6, 1950], the [RCA tri-color] tube had an inadequate number of dots." (R. 160)
(Picture Texture—Structural) (Brightness—Contrast)		Dot structure and moire pattern have been substantially eliminated due to use of improved receiver circuits and increased number of phosphor dots. (R. 400)	There was no demonstration by RCA of minimizing dot structure and "it appears to the Commission that if the dots are smoothed out, the consequences are likely to be a loss in resolution or contrast, or in both." The RCA tri-color tube "had a serious moire pattern in it". (R. 144, 153)

	Condon Committee Report	RCA Progress Report	First Report of Commission
(Adaptability and Convertibility)	"The black-and-white rendition of the RCA color transmission has higher resolution and better flicker-brightness performance" than does the black and white rendition of the CBS color system. (R. 368)		The Commission made no real distinction between the quality of the black and white rendition from the CBS color system on an adapted receiver and the black and white rendition from RCA color transmissions on a standard receiver. (R. 163-64)
(Equipment Considerations)		Receivers have now been developed incorporating new simplified and stable circuits. (R. 401)	The receiving equipment utilized by RCA is exceedingly complex and the Commission "is not satisfied that the [tri-color] tube solves the problem of complex receivers". Color controls are critical and not stable. (R. 152, 160)